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ABSTRACT

Papers delivered at the 1989 program session of the Library of Congress Network Advisory Committee (NAC) focused on ways in which newer technologies and document delivery networks are changing current practices in document delivery and information services. Charles P. Bourne, chair of the program committee, presented an overview of document delivery services and the impact of technology on the growth of these services in his paper, "A Review of Technology and Trends in Document Delivery Services." This was followed by seven papers focusing on various aspects of document delivery service: (1) "Interlibrary Loan: Current Use and Patterns" (Kate Nevins, OCLC); (2) "DOCLINE (an automated document requesting and routine system): The National Library of Medicine Experience" (Lois Ann Colaianni); (3) "Document Delivery Systems at the University of California: An Overview" (Dennis E. Smith and Clifford A. Lynch); (4) "Application of Technology in Document Delivery: The CISTI (Canada Institute for Scientific and Technical Information) Experience" (Margaret Y. Walshe); (5) "Information on Demand: Information Broker Services--The IOD (Information on Demand) Experience" (Christine Maxwell); (6) "UMI/IEEE Products" (Pauline Angione Zoellick); and (7) "Image Transmission over Internet: The NAL (National Agricultural Library) Experience" (Gary K. McCone). This report includes the text of the eight papers, a summary of the business session, and five appendices: the meeting agenda; a statement by James H. Billington, the Librarian of Congress; Network Advisory Committee (NAC) criteria for membership; letters to Daniel H. Carter by Henriette D. Avram and George F. J. Mesmer; and the 1989 report of the U.S. National Commission on Libraries and Information and Information Science. (DB)

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No. 10 *The Information Economy in the U.S.: Its Effect on Libraries and Library Networks:* Proceedings of the Library of Congress Network Advisory Committee Meeting, November 14–16, 1984. (Washington: Library of Congress, 1985). 59 p. $7.50.

No. 9 *Electronic Information Delivery Systems:* Proceedings of the Library of Congress Network Advisory Committee Meeting, April 18–20, 1984. (Washington: Library of Congress, 1984). 79 p. $6.00.

No. 8 *Public/Private Sector Interactions: The Implications for Networking.* (Washington: Library of Congress, 1983). 48 p. $5.00.

No. 7 *Document Delivery—Background Papers Commissioned by the Network Advisory Committee.* (Washington: Library of Congress, 1982). various pagings. $5.00.

Continued on Back Cover

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CONTENTS

FOREWORD 1

ATTENDEES 3

INTRODUCTION 5

PROGRAM SESSION 9

A REVIEW OF TECHNOLOGY AND TRENDS IN DOCUMENT DELIVERY SERVICES, Charles P. Bourne 9

INTERLIBRARY LOAN: CURRENT USE AND PATTERNS, Kate Nevins 29

DOCLINE: THE NATIONAL LIBRARY OF MEDICINE EXPERIENCE, Lois Ann Colaianni 33

DOCUMENT DELIVERY SYSTEMS AT THE UNIVERSITY OF CALIFORNIA: AN OVERVIEW, Dennis E. Smith and Clifford A. Lynch 41

APPLICATION OF TECHNOLOGY IN DOCUMENT DELIVERY: THE CISTI EXPERIENCE, Margaret Y. Walshe 49

INFORMATION ON DEMAND: INFORMATION BROKER SERVICES - THE IOD EXPERIENCE, Christine Maxwell 53

UMI/IEEE PRODUCTS, Pauline Angione Zoellick 63

IMAGE TRANSMISSION OVER INTERNET: THE NAL EXPERIENCE, Gary K. McCone 69

SUMMARY OF BUSINESS SESSION 77

APPENDICES

A. Meeting Agenda 81
B. Statement of James H. Billington, the Librarian of Congress (September 15, 1989) 83
C. Library of Congress Network Advisory Committee: Criteria for Membership (Rev. November 1989) 87
D. Letters to Daniel H. Carter by Henriette D. Avram and George F.J. Mesmer 89
E. U.S. National Commission on Libraries and Information and Information Science, 1989 report 99

FOREWORD

Document delivery has been the topic twice before of meetings arranged by the Library of Congress Network Advisory Committee. In March 1982 we commissioned three papers to set the framework for discussions on document delivery. A "gradual shift to electronic delivery of copies with the introduction of high-speed tele-facsimile equipment" was predicted and technology as well as economic factors were seen as the major forces shaping future developments. In April 1984, we reviewed electronic information systems--electronic manuscript generation and delivery, online fulltext search and retrieval, online database production and distribution, trends in equipment, and the changing interactions between libraries and library users. The results of both program sessions have been issued in *Network Planning Papers* Nos. 7 and 9.

The purpose of this meeting was to raise the awareness of NAC members about the changing environment of document delivery and to investigate what NAC might recommend regarding document delivery in today's environment.

I gratefully acknowledge the assistance of the program subcommittee--Charles P. Bourne, DIALOG Information Services, Inc., Lois Ann Colaianni, National Library of Medicine (NLM), and Dennis Smith, University of California (UC), Berkeley--in making the meeting a success. The program subcommittee joins me in thanking all those who prepared papers and gave presentations: Charles P. Bourne, DIALOG; Kate Nevins, OCLC, Inc.: Lois Ann Colaianni, NLM; Dennis Smith and Clifford A. Lynch, UC; Margaret Y. Walshe, Canada Institute for Scientific and Technical Information; Christine Maxwell, Information on Demand, Inc; Pauline Angione Zoellick; and Gary K. McCone, National Agricultural Library (NAL). The editorial work was done by Sigrid G. Harriman, Library of Congress.

The document has been issued within the *Network Planning Paper* series. It should be noted that the opinions expressed in the proceedings are those of the individual speakers and do not necessarily reflect the opinions of their organizations.

Henriette D. Avram
Chair, Network Advisory Committee

July 15, 1990

ATTENDEES

Organizations	Representatives
American Association of Law Libraries	Robert L. Oakley
American Library Association	Joseph F. Shubert Carol C. Henderson
American Society for Information Science	Ward Shaw
AMIGOS Bibliographic Council, Inc.	Bonnie Juergens
Association for Library and Information Science Education	Toni Carbo Bearman
Association of American Publishers	Sandra K. Paul
Association of Research Libraries	Prudence S. Adler
Bibliographical Center for Research	David H. Brunell
Capital Consortium Network	Dennis Reynolds
Council on Library Resources	Eleanor Sacks
DIALOG Information Services, Inc.	Charles P. Bourne
EDUCOM Networking and Telecommunications Task Force	Ronald Larsen
Federal Library and Information Center Committee	Mary B. Levering
Library of Congress	Henriette D. Avram (chair) Sigrid G. Harriman (secretariat)
Medical Library Association	Erika Love
MINITEX Library Information Network	William DeJohn
National Agricultural Library	Samuel Waters
National Library of Medicine	Lois Ann Colaianni

Nelinet, Inc.	Marshall Keys
OCLC Online Computer Library Center, Inc.	Kate Nevins
Pittsburgh Regional Library Center	H. E. Broadbent III
Research Libraries Group, Inc.	C. James Schmidt
Society of American Archivists	Richard V. Szary
Southeastern Library Network	Frank P. Grisham
Special Libraries Association	Sharyn J. Ladner
University of California	Dennis E. Smith
U.S. National Commission on Libraries and Information Science	Susan K. Martin
Utlas International	Richard W. Newman
Western Library Network	Ronald F. Miller

Organizations	Observers
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National Library of Canada	Leigh Swain
University of California	Clifford A. Lynch
University Libraries, Van Pelt Library	Mary E. Jackson
U. S. Department of Education	Neal K. Kaske
Consultant	Louella V. Wetherbee

INTRODUCTION

Whether the issue is bibliographic control, collection development, user access, or document delivery, the key word of the nineties will be networking.

Just as the perfection of xerography in the 1960's led to a rapid increase in interlibrary loans, especially from the journal literature, the availability of online bibliographic databases greatly increased the user public's awareness of the availability of information, which led to a phenomenal growth of interlibrary loan and document delivery traffic in the seventies.

Rapid technological advances are changing the methods used for document delivery services, and, although once almost exclusively the domain of libraries, document delivery is also becoming "big business" in the private sector.

Today, an ever growing volume of documents is being delivered by providers other than libraries. In the United States alone, almost three hundred concerns are engaged in this business, among them indexing and abstracting services, such as the Chemical Abstract Service (CAS), Education Resources Education Center (ERIC), Institute for Scientific Information (ISI), National Technical Information Service (NTIS), and University Microfilm International (UMI), as well as a sizable contingent of information brokers.

How newer technologies and document delivery networks are changing current practices in document delivery and information services was the central theme of the 1989 winter program session of the Library of Congress Network Advisory Committee (NAC).

Chair of the program committee, Charles E. Bourne of DIALOG Information Services, introduced the topic by presenting an overview of document delivery services and the impact of technology on the growth of these services, attributed to the (1) continuing activities by major library systems and networks (the traditional pattern); (2) information delivery by non-library organizations; (3) rise of digitally stored full-text and images, transmitted from a central facility; (4) digital images stored and used locally; (5) use of electronic networks for document ordering and delivery; and (6) growth of facsimile delivery transmissions. (The term "fax" will be used for the terms "facsimile," "telefacsimile," or "telefacsimile transmission" for the remainder of the introduction).

Traditional library activities include order switching, such as the OCLC ILL (Interlibrary Loan) subsystem, which accepts and redirects between four to five million ILL requests a year, or order fulfillment, i.e., document delivery. The British Library Document Supply Centre is an example of a major international document delivery service, with more than three million orders fulfilled each year.

Non-library organizations whose main business may be abstracting/indexing or information brokers have entered the information delivery business. The latter is also offering

current awareness service, retrospective literature searching and translations, often concentrating on a particular type of publication (e.g., patents, standards) or subject content (e.g., medical). To provide competitive document delivery service, these brokers use the resources of libraries, either through formal or informal arrangements.

Central online digital and image storage has been in effect since the early 1970's, starting with the LEXIS online system. Newspapers in particular have made use of this technology (*New York Times, Washington Post,* and full-text wire services, e.g., American Press, United Press International, Reuters) are prominent examples. Full-text newsletters and journal articles are also on the rise. DIALOG alone offers full-text online from over 1,000 periodical publications, representing 600,000 articles. To date, online full-text files have been generally devoid of illustrations and special characters, but enhancements of files with digitized or graphic images are becoming more widespread, particularly for chemical structures, patent images, and mathematical symbols and notations. The electronic image storage systems being developed today are often planned for distribution to multiple sites, mostly digitally encoded Compact Disks-Read Only Memory (CD ROM) with digital indexing of the stored data.

Online document ordering started in the late 1970's. Several online services provided features which permit searchers to give commands which transfer selected bibliographic records to document delivery services of their choice, often at competitive rates, as alternatives to some traditional library interlibrary loan or photocopy service costs. Electronic mail delivery and fax service are increasingly popular extensions of this service.

Following Bourne's overview, a series of speakers focused on various aspects of document delivery service:

Kate Nevins, OCLC, Inc., presented OCLC ILL subsystem patterns for ILL between library types and between states, and an analysis of changes and trends in these patterns. Its subsystem usage rose from 2.25 million in 1984/85 to more than 4.25 million in 1988/89. Since ILL activity using OCLC represents an undetermined percentage of the entire activity and consequently addresses only filled requests, it is an indication of the enormous volume of ILL activity in general.

Lois Ann Colaianni, National Library of Medicine (NLM), corroborated this remarkable increase by noting that NLM routed 1.6 million journal requests from 1,800 participating libraries through its DOCLINE system last year. One of DOCLINE's unique features is the Routing System with two major components, the holdings database and the routing maps. The former allows the system to match the request with the holdings of a specific library. If there is no match, DOCLINE selects another library in the randomized list and begins the matching process again. The routing map allows a library to identify a maximum of eighty lending libraries in predetermined order of preference. Each library receives periodic management reports of the titles requested.

Dennis Smith, University of California (UC), described the current status of document delivery systems in operation on the individual UC campuses and the direction planned for the future. He described the Baker Service as a fee-based document delivery and bibliographic verification service available to UC Berkeley faculty, graduate students, and staff. It offers four types of services: delivery of library books and photocopies to a user's campus mailbox (at $2.50 per item requested), verification of citations using local and national catalogs and standard bibliographic works (at $1.50 per citation), Interlibrary Borrowing Service (for material not available at UC Berkeley, Baker will provide the complete bibliographic information necessary for requesting

material through Interlibrary Loan), and placement of the request with Interlibrary Loan, including subsequent delivery of the material to the patron when it arrives (at $2.50 per item). Requests for Baker Service can be made through electronic mail, through campus mail, and by phone.

The Berkeley library also offers fax service through its Interlibrary Borrowing department (but not via Baker and not to its own campus). The service is labor intensive, expensive, and therefore not encouraged. The average price of $15 per request includes the phone line charges and transmission for up to fifteen pages. Despite these rather significant charges, Berkeley is faxing material all over the world. Since September 1989, users at the Irvine Campus may search the MELVYL online union catalog to request delivery of library materials, interlibrary loans, and journal articles from the MELVYL MEDLINE database. The result is an overwhelming success.

The Canada Institute for Scientific and Technical Information (CISTI) has experienced a tripling of document delivery services during the past decade--from 544 to 1,700 requests per day. Margaret Walshe, CISTI, described the use of automation at the front-end of the document delivery process by matching requests against databases which reflect the shelf addresses or call numbers of the items for easy accurate retrieval. CISTI is now investigating greater use of automation for the delivery system, specifically FAX Group IV technology.

Christine Maxwell, Information on Demand, Inc. (IOD), represented the private sector and described the impact of new technologies--such as fully automated online ordering, fax and modem-to-modem transmissions of full-text documents, new document ordering systems, and CD-ROM Document Delivery Collections, such as ADONIS. She pointed out that in spite of rapid developments of "captive" document collections on full-text Compact Disk-Read Only Memory (CD-ROM), such as ADONIS, private sector document suppliers will continue to rely on libraries as the source for most of the documents they provide to their clients, and are looking toward cooperative document supply ventures with the public sector.

Pauline Angione Zoellick, an independent consultant, provided an overview of current and future electronic systems used in document delivery. In her presentation she concentrated on developing technologies, expanding markets, electronic redistribution rights, and future possibilities. She feels that many questions regarding document delivery will be answered during the coming decade.

Full-text and image transmission is the focus of a special project of the National Agricultural Library (NAL) in cooperation with forty-four land grant universities. Gary McCone reported on the creation of full-text CD-ROMs has been initiated, the first containing one thousand Canadian government documents pertaining to acid rain. These are being scanned, digitized, and cataloged, resulting in eleven thousand pages on three CD-ROMs which will be distributed to the participating land grant libraries. Future directions at NAL include the transmission of digitized page images to remote sites and the exploration of creating databases of scanned images.

In summary, all presenters concurred that networking and special linkages have become a major thrust in the document delivery arena. Discussions during the plenary session following the presentations. NAC members agreed that one can expect, within the next two years, the development of a series of prototypes of image/full text systems mounted specifically for document delivery services. These trends need careful monitoring by NAC.

Prepared by: Erika Love

A REVIEW OF TECHNOLOGY AND TRENDS IN DOCUMENT DELIVERY SERVICES

Charles P. Bourne[1]

Abstract

This paper reviews the major lines of technical development being pursued to extend or replace traditional interlibrary loan (ILL) and photocopy service and to facilitate the delivery of source documents to individual end users. Examples of technical approaches discussed are: (1) the inclusion of full text and image data in central online systems; (2) image work stations such as the ADONIS[2] and UMI[3] systems; and (3) the use of electronic networks for document ordering and delivery. Some consideration is given to the policy implications for libraries and information systems.

Introduction and Background

ILL and other document delivery services have been a growing part of library activities for many years - activities that have shown continued and significant growth in most libraries. The traditional ILL part has been replaced or augmented to a large extent in recent years by the use of photocopy or other non-returnable products. A large fraction of this material now consists of

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[1] Charles P. Bourne is the director of the General Information Division at DIALOG Information Services, Inc., in Palo Alto, California. This paper is based on Mr. Bourne's introductory presentation to the program session given on November 30, 1989, at the Library of Congress Network Advisory Committee meeting in Washington, DC. The opinions expressed herein are the author's and do not necessarily reflect those of DIALOG Information Services, Inc. The author would appreciate the courtesy of notification of any use or reproduction of this paper.

[2] To learn more about the ADONIS project, see Christine Maxwell's paper.

[3] University Microfilm International has changed its name to UMI, Inc.

serial publications. This growth in document delivery activity by a library has been a direct service support to two different constituencies: the library's own personal users, and other libraries (i.e., ILL). This growth caused both problems and opportunities.

Technology has always been a factor in facilitating this activity, both for creating and distributing copies, and for handling messages about the copies. This includes the examples of technology utilization shown in Table 1 (page 17).

Proprietary rights have been, and continue to be an issue here. The deliberations and discussions in this area have been accompanied by new legislation (e.g., the new U.S. Copyright Act of 1976) and new organizations (e.g., the Copyright Clearance Center).

It is appropriate for us to review the current state of affairs in regard to document delivery services today, to identify new developments and issues that need to be addressed by the Library of Congress Network Advisory Committee (NAC).

Activities that deserve special attention are the (1) extension of traditional library activities, (2) information delivery by non-library organizations, (3) central online digital and image storage, (4) local storage of digital image data, (5) other relevant technical issues, and (6) resurgence of facsimile[4] transmission. These activities are discussed in more detail in the following sections.

1. Extension of Traditional Library Activities

Many individual libraries have continued to develop means to handle their increasing demands for document delivery service, either by themselves or as part of cooperative library network activities. Some of those means include the gradual extension or expansion of their regular services; some include new means and services. Library networks have also expanded their activities in this area on behalf of their member institutions.

This activity has generally been along two different lines: (1) order switching; and (2) order fulfillment or document delivery. The OCLC Interlibrary Loan Subsystem service is one such example of an order switching system, accepting and re-directing 4.3 million ILL requests in 1988/89 by means of their new computer-based ILL system. The British Library Document Supply Centre is an example of a major international document delivery service, with over 3.0 million orders fulfilled each year. Examples of the volumes of activities associated with some of these major libraries and library systems are given in Table 2 (page 18).

2. Information Delivery by Non-Library Organizations

An increasing amount of document delivery service is being provided by organizations other than libraries. These organizations are usually abstracting and indexing services or third party information brokers.

Abstracting and Indexing Services

Many abstracting and indexing services often provide, upon request, and from their own associated library collection, copies of material that they have abstracted or indexed. This is a logical extension of their main service. This is usually a low-volume, low-profile activity, but some

[4] The terms "facsimile," telefacsimile," or "telefacsimile transmission" will hereinafter be cited as "fax."

services such as the Chemical Abstracts Service (CAS), Institute for Scientific Information (ISI), and Engineering Information have been quite aggressive about providing service in this area. Examples of such activities are given in Table 3 (page 19).

Information Brokers

A relatively new type of organization has entered the document delivery field during the last twenty years, the information broker. Several hundreds of these firms, usually commercial ventures, offer to fulfill the information needs of mostly commercial institutions. Those information needs usually include current awareness service, retrospective literature searching, translations, and document delivery service. For many of those brokers, the major revenue is from document delivery service. These brokers may concentrate their activities on a particular type of publication (e.g., patents, standards) or subject content (e.g., medical).

To provide competitive and effective document delivery service, these brokers usually make some arrangements to use the resources of accessible libraries that are important to them. These broker-library arrangements can be formal and cooperative, in which the broker provides some special compensation to the library, and maybe even provides or shares equipment with library staff, and in return is provided special access and work space in the library.

Some of these broker-library arrangements may not have any formal basis, and may depend on the use of local "stringers" who use the library on behalf of the broker. Some examples of information brokers and their activities are given in Table 4 (page 20).

3. Central Online Digital and Image Storage

Full Text Character Storage

It has been possible for some time now to search some remote online retrieval systems to retrieve the full text of a known publication and have it immediately transmitted online to the requestor, or printed off line and sent to the requestor. This capability is being used more frequently now as an alternative mechanism for more traditional document delivery systems -- it is fast, but presently restricted to certain materials available in machine readable form.

In a practical sense, this electronic delivery of source publications from centralized digital storage systems has been in use since the early 1970's, starting with the LEXIS online system and its full text legal statutes and case law. This capability then extended to other types of publications such as newspapers. The full text of the *New York Times*, for example, has been available online since 1981, initially from the New York Times itself, and now exclusively from Mead Data Central, Inc. The full text of the *Washington Post* is available as a full text database on nine online systems, consequently, users interested in a recent article from this publication can obtain it very quickly online (no matter where in the world they are) instead of obtaining it by the slower and more traditional library services. Hundreds of newspapers, including the examples shown in Table 5 (page 22), are currently available full text online, and more become available every month. For example, the Data Times Service provides full text of more than twenty U.S. newspapers and VU/TEXT service provides full text of more than forty regional U.S. newspapers. The Mead NEXIS service also carries many full text newspapers online.

Full text of wire service stories (e.g., Associated Press (AP), United Press International (UPI), Reuters), an information source with no single print or microform equivalent, is also available from several online services, usually trimmed down to contain only the final version of

perhaps several earlier ones of a news story as it developed and was transmitted throughout one day. Some examples of these services are given in Table 6 (page 22).

Full text of newsletters and journal articles have also started to become available online during the last several years. In the case of newsletters, at least one online service (NewsNet) was established, and operates today, almost entirely as a collection of databases of the full text of newsletters, newspapers, and wire services (over 400 total) - with over twenty of these publications updated daily before the print equivalents are delivered. Full text of hundreds of newsletters, most of which are generally unavailable in most libraries, are available for immediate online delivery. Some online databases are available which are collections of full text from many different magazines or newsletters; examples are the "Magazine ASAP", "Trade & Industry ASAP", and "Computer ASAP" files from the Information Access Company, and the PTS [Predicast Terminal System] Newsletter Database from Predicasts as described in Table 7 (page 23). Examples of some of these newsletters that are available online in full text form are given in Table 8 (page 24).

Full text of journal articles started to become widely available online in 1983 when the American Chemical Society made eighteen of their peer-reviewed journals available as a fully searchable and displayable file on the Bibliographic Retrieval Service BRS (and subsequently transferred to the STN file). These were more than 40,000 full text records, but without figures and special graphics. This trend has continued, with an increasing number of full text journal articles available online. The DIALOG service, for example, currently has full text online from over nine hundred periodical publications, representing over 600,000 articles. Examples of some of the types of journal publications full text that are available online are given in Table 9 (page 25).

Image Storage

To date, the online full text files have been files in American Standard Code for Information Interchange (ASCII) characters, generally devoid of illustrations and special characters, and often replacing large or complex tables with a single legend. However, images have recently been added to online files for improved search output (e.g., on DIALOG -- all the 350,000 images associated with all registered U.S. trademarks, more than 56,000 images of the chemical structures associated with the Beilstein[5] file, and soon the many images associated with the Heilbron file; and on STN -- about 125,000 of the front page drawings of recent German patents). It is expected that this practice will extend to other full text files such as those with patent images or maps.

Another example of an effort to develop a centralized online file of digitized images wa s the prototype Laser DISCLOSURE system announced in 1984 by the Disclosure Information Group for implementation in 1985. That system was planned to scan and store the pages of any report filed at the U.S. Securities and Exchange Commission (SEC) file from 1967 to present, including those filed the previous evening (about 20,000 documents per day). Images were to be retrieved from a central service and sent to subscriber offices for printing at rates up to 120 pages per minute. However, this system never became fully operational and was replaced by a system that distributed Compact Disk-Read Only Memory (CD-ROM) disks of that same information on a subscription basis.

One major online database (MathSci) is available online, with graphic enhancements; it is coded with a linear notation (TeX) for mathematical symbols and notation so that the use of an appropriate software package at a personal computer (PC) terminal will result in the display of

[5] The Beilstein and Heilbron files are both machine-readable files containing chemical information.

abstracts and reviews with all the graphic representations normally seen in mathematical text.

4. Local Storage of Digital Image Data

The preservation and distribution of copies of some older materials as part of library collection preservation and space management efforts has led to the development of some pilot electronic image storage systems, initially with analog techniques, but more recently with digital approaches. The Library of Congress (LC) introduced its first optical disk user station in mid-1984 as part of its Optical Digital Disk Pilot Project to show how a print and photography collection could be represented in a videodisk form. The first of the analog videodisks, for example, enabled users to sort through or study any one of nearly 40,000 photos, posters, and other pictorial items from LC's Prints and Photographs Division's collections, including some rare glass negatives and other fragile materials that would otherwise be unavailable to the public.

In a similar manner, the National Library of Medicine (NLM) produced an experimental videodisk in 1985 that contained over one thousand selected images from the Library's extensive historical prints and photographs collection. The British Library's (BL) efforts with digital images for conservation and image delivery started at about the same time.

The electronic image storage systems being developed today are often planned in the context of being replicated at multiple sites to satisfy local or regional demand. Increasingly, this consists of digitally-encoded CD-ROMS with representations of scanned images of the printed pages (a microform equivalent), often with digital indexing of the stored data. Some of these systems have been developed at the initiative of an abstracting or indexing service with a direct interest in the subject material; some of it has been developed at the initiative of journal publishers.

One recent example is the test product prepared and marketed by UMI in 1989 that contains the entire collection of the Institution of Electrical Engineering (IEE) and the Institute of Electric and Electronic Engineers (IEEE) journals and conference proceedings for 1988 (200,000 pages plus all the associated indexing from the INSPEC database, on twenty-five to thirty CD-ROM disks). This is meant to be a stand-alone system to be installed in local engineering libraries.

Another product demonstrated in 1989 by UMI provides the full text on CD-ROM for three hundred of the eight hundred journal titles in the field of business and management that are indexed in the online database ABI/INFORM. Researchers can search Business Periodicals Ondisc at an integrated work station, locate and review material citations and abstracts, then retrieve and print complete articles. The work station and disk updates are available on a subscription basis. All full text articles in the UMI and ADONIS products are copyright-cleared.

Another variation on this distributed approach is the ADONIS system that stores full text articles from 219 journals from ten primary journal publishers (Blackwell Scientific Publications, Butterworth & Co., Churchill Livingstone (Publisher), Elsevier Scientific Publishing Company, C. V. Mosby Company, Levin & Munksgaard (Copenhagen), Pergamon Press, Springer Verlag, Georg Thieme Verlag, John Wiley & Sons) on CD-ROM disks (including indexing by Excerpta Medica). This system, which started with discussions among interested publishers in 1980, went through pilot testing from mid-1987 through 1989 in thirteen information centers throughout the world, including the BL. A total of eighty-four disks were issued (one disk issued per week) for a total of about 200,000 articles. Preliminary results indicate a cost savings to libraries. A decision was made to go operational in January 1991 with the full text from 426 predominantly medical journal titles.

The CD-ROM disks are scheduled to arrive within two weeks of the receipt of the journal. Libraries are expected to be able to obtain an ADONIS work station and a subscription for weekly CD-ROM updates in return for an annual subscription fee, and a per article copy charge that will be determined by the publishers. The system will make use of an ADONIS Article Identification Number.

As another example of a local image storage work station, the Laser DISCLOSURE system that started out to be a central online service was converted to a system that now produces and distributes images of SEC reports for six thousand companies on CD-ROM disks that are sent out with weekly updates. An institution's SEC Library would be updated with as many as 1.8 million pages of information with about one hundred disks per year (equivalent to 51,000 microfiche). In 1990, coverage is scheduled to be expanded to over 10,000 companies. The system is available on a subscription basis. Examples are summarized in Table 10 (page 27).

5. Other Relevant Technical Issues

Online Document Ordering as an Adjunct to Online Searching

With most online bibliographic search services, only a fraction of the items represented by the retrieved citations are locally available to the searcher. With this in mind. starting in the late 1970s, several online services provide features which permit searchers to give commands which transfer selected bibliographic records from search answer sets to document delivery services of their choice, thus permitting the searching and subsequent document ordering to be done as a single consolidated operation, and in some situations requiring no rekeying of the citation details. The DIALOG service, for example, offers the searcher the choice of more than seventy different participating document delivery services to order from as part of the online process, and transmits several hundred thousand document orders per year from its users to document delivery services. Hundreds of thousands of publications are ordered this way each year through the online services.

UnCover, a project at the Colorado Alliance of Research Libraries (CARL), created a database in 1988 to provide an online multi disciplinary index to articles in about 6,000 journals -- particularly those journals held by the CARL Member Libraries. Once a user located a desired journal title, the system displays a detailed listing of all issues checked in on the system. The next phase of this system implementation in 1989 calls for the linking of the user's journal title to a union list of serials, so that the user can request delivery of identified documents from their terminals. This is a good example of the tailored linkage of online searching of a comprehensive database to assure document delivery from local or coordinated holdings.

DIALOG's non-prime time service, Knowledge Index, offers document delivery support in North America for more than seventy of its databases (over 40 million citations) at a journal article reprint cost of $7.50 + $0.35 per page photocopied per reprint; DIALOG's medical end-user service, DIALOG Medical Connection, offers document delivery support for all of its twenty-eight databases (over 32 million citations) at a cost of $7.50 per journal article reprint. As examples of provided commercial services, these are interesting rates as alternatives to some traditional ILL or photocopy service costs.

Online Full Text Access Output as an Adjunct to Index File Searching

Some online services' bibliographic or abstract files provide pointers or other means so that after a searcher locates a bibliographic record of interest, the search can easily be linked to another file that contains the full text described in that bibliographic record.

6. Resurgence of Facsimile Transmission

Document Ordering

Electronic mail services are being used more extensively for the communications associated with the ordering of documents. Examples are the ALANET and OnTyme systems in North America. To a large extent, this replaces Telex or Teletype ordering practices. An estimated 35% of document requests currently received by BL's Document Supply Centre are received via electronic processing, and over 75% of requests received by the Canadian Institute for Scientific & Technical Information (CISTI) are in electronic mail form.

Document Delivery

Some online services are coupled with electronic mail services so that search output, including such things as full text source publications, can be sent to an electronic mail address. The interesting wrinkle here is that instead of output being sent to the searcher, it can instead be directed to the original requestor's electronic mail address. Thus a person who stops at the library reference desk to request some copies of stories from the Washington Post, could have those stories waiting at the terminal upon his or her return.

A simple extension of this approach would be for the online service to send the search output to a fax address instead of an electronic mail address, thus providing immediate document delivery in printed form to a location close to the requestor's work space.

Electronic mail systems are also being used to route ILL messages (e.g., from OCLC's Interlibrary Loan Subsystem) between a main library and its branch libraries.

Issues for Consideration by NAC

The technological developments discussed in this paper are permitting libraries to do things that they might not have considered before. Some result in policy implications for those libraries (e.g., the extent to which end user searchers would be authorized to order documents online). There may also be some issues that also have policy implications that the Network Advisory Committee of the Library of Congress should consider. Examples that come to mind are listed in Table 11 (page 28).

TABLE 1

REPRESENTATIVE MILESTONES IN DOCUMENT DELIVERY SERVICE

DATE	ACTIVITY
1951	ALA ILL form formally approved by ALA.
1954	IFLA adopted international ILL form.
ca. 1958	Demonstration of automated image storage/retrieval devices (e.g., Filmorex, Minicard, Magnacard)
pre-1960	First use of 35 mm camera to facilitate library photocopying.
pre-1960	First use of Teletype/Telex for ILL.
pre-1961	Start of major document delivery service by British Library (Boston Spa)
ca. 1965	First use of dry photocopy techniques (Xerox 914)
1966	First use of fax for ILL (University of California, one-month test in 1966, NYSILL FACTS project pilot operation 1967-68)
pre-1970	Demonstration of first automatic page turner for library work.
1972	Williams & Wilkins vs. the U.S. reported out by U.S. Court of Claims.
1976	New U.S. Copyright Act of 1976.
1978	Initial operation of Copyright Clearance Center.
1979	OCLC ILL Systems becomes available for use.
1982	CLASS initiates OnTyme Electronic Mail Service for ILL requests.
1983	ACS collection of articles from eighteen journals made publicly available online.
1984	ALANET initiated for ILL requests.
1987	ADONIS pilot operation -- 200,000 journal articles from six publishers available on CD-ROM in several test sites.
1989	UMI pilot operation -- major journal article collections available on CD-ROM in twelve test sites (200,000 pages of IEEE/IEE text)

TABLE 2

EXAMPLES OF MAJOR LIBRARY AND LIBRARY NETWORK SYSTEMS FOR ILL

SYSTEMS	VOLUME OF ACTIVITY
Order Switching Systems	
OCLC	4.3 million items requested in 1988/89; (86% fill rate by participating libraries)
NLM DOCLINE	1.6 million items requested by participating health service libraries (92% fill rate, 85% serials)
RLIN	300,000 transactions per year (83-87% fill rate, 85% serials)
Order Fulfillment	
BL Document Supply Centre	over 3,0 million orders fulfilled each year (0.5 million from abroad)
CISTI	427,000 items requested in 1987/88.
NLM	180,000 items per year filled from NLM's own collection.
University of California, Berkeley	120,000 photocopies per year to other libraries.

TABLE 3

EXAMPLES OF DOCUMENT DELIVERY SOURCE MATERIAL OF ABSTRACTING AND INDEXING SERVICES

SERVICE	DOCUMENTS PROVIDED
AIAA	Copies of all 1.6 million items cited in Aerospace Database (1962 to date)
AGI	Copies of any of the 1.5 million items cited in the Georef database (1785 to date)
Amer. Soc. for Metals	Copies of the 750,000 items cited in the Metadex database since 1966, and the 135,000 items cited in *World Aluminum Abstracts* since 1968.
CAB	Copies of most of the 2.2 million items cited in CAB Abstracts, other than books, reports, and theses since 1972.
CAS	Most Chemical Abstracts citations since 1978, and Soviet citations since 1973.
Derwent Publ. Ltd.	Copies of all 1.5 million patents cited in World Patent Index files since 1963.
Disclosure	Copies of any report filed with SEC since 1966.
Engineering Info. Inc.	Copies of 2.5 million articles and conference papers indexed in COMPENDEX since 1970.
ERIC	Copies of 300,000 reports cited in the ERIC database since 1966.
Geosystem	Copies of 610,000 items cited in Geoarchive database since 1974.
IFI/Plenum Data Co.	Copies of 3.6 million U.S. patents and other patents cited in IFI database since 1947.
ISI	Original Article Tear Sheets (OATS) from over 6,000 journals cited in ISI databases since 1984.
Math Reviews	Copies of 1.1 million publications covered in MATHSCI database since 1959.
Nat'l. Standards Assoc., Inc.	Copies of any of the 210,000 standards, standard specifications, or other documents found in the IHS Standards & Specifications database.
NTIS	Copies of 1.3 million documents cited in the NTIS database since 1964.
UMI	Copies of dissertations and master theses for most of the 1.0 million items cited in Dissertations Abstracts Online from 1861 to date.

TABLE 4

EXAMPLES OF COMMERCIAL INFORMATION BROKER DOCUMENT DELIVERY SERVICES

ORGANIZATION	MATERIAL PROVIDED
Dynamic Information	Copies of items from monographs, serials and journals, and technical reports; Dynamic serves as the authorized document delivery service for several database suppliers (e.g., IAC, ASHP) to supply copies of any material cited in their databases.
FIND/SVP	Copies of virtually all types of published materials.
Global Engineering	Copies of government and industry standards, Documents including two hundred ten thousand items cited in the International Standards & Specifications database.
Information on Demand (Maxwell)	Printed materials of all types from any country or source.
Information Store	Copies of any type of published literature.
London Airmail Books	Stock of British fiction and non-fiction books, including publications from the British government and European Community, and items cited in *British Books in Print* and HMSO databases.
Medical Data Exchange	Copies of most types of publications in the health care field.
Medical Literature Retrieval	Copies of journal articles from academic medical literature cited in Medline or Embase databases.
Pergamon Copy Service	Copies of U.S. and non-U.S. patents and trademarks and published applications.
Tracor Jitco	Copies of journal articles, reports, and other material.
UMI Article Clearinghouse	Copies from over 10,000 periodicals directly licensed for photocopying.

TABLE 5

EXAMPLES OF NEWSPAPER FULL TEXT AVAILABLE FROM CENTRAL ONLINE SERVICES

NEWSPAPER	ONLINE SERVICE
American Banker (over 100,000 records from 1979 to date)*	DIALOG, Mead, NewsNet
Arizona Republic & Phoenix Gazette (1986 to date)	Vu/Text
Bond Buyer (over 113,000 records from 1981 to date)	DIALOG, Mead, NewsNet
Chicago Tribune (over 110,000 records from 1988 to date)	DIALOG, Vu/Text
Christian Science Monitor (1980 to date)	Mead
Commerce Business Daily (over 2 million records from 1982 to date)	DIALOG
Dallas Morning News (1984 to date)	DataTimes
Financial Times (over 215,000 records from 1982 to date)	DIALOG, Mead
Houston Chronicle (1985 to date)	DataTimes
Houston Post (1985 to date)	Vu/Text
Los Angeles Times (1985 to date)	DIALOG, Mead
New York Times (1980 to date)	Mead
Philadelphia Inquirer	DIALOG, Vu/Text
San Francisco Chronicle (1985 to date)	DataTimes
Wall Street Journal (1984 to date)	DOW JONES
Washington Post (over 400,000 records from 1977 to date)	DIALOG, Mead, VuText

* Note: Time span and record count for a given title may not apply to all services that provide that title.

TABLE 6

EXAMPLES OF WIRE SERVICES FULL TEXT AVAILABLE FROM CENTRAL ONLINE SERVICES

WIRE SERVICE	ONLINE SERVICE
AP (over 400,000 records from 1977 to date)* Vu/Text	DIALOG, Mead, NewsNet
Business Wire (over 114,000 records from 1983 to date)	DIALOG, Mead
Catholic News Service	NewsNet
Jiji Press Ticker ServiceMead,	NewsNet
Kyodo News Service (over 85,000 records from 1984 to date)	DIALOG
McGraw-Hill News (over 80,000 records from 1987 to date)	DIALOG
PR Newswire (over 130,000 records from 1980 to date)	DIALOG, Mead, NewsNet
Reuter's (over 450,000 records from 1979 to date)	DIALOG, Mead, NewsNet
UPI (over 400,000 records from 1980 to date)Vu/Text	DIALOG, Mead, NewsNet
Washington Presstext (over 40,000 records from White House & State Dept. news releases, interview transcripts, policy statements, and other background information from 1981 to date)	DIALOG
Xinhua (1977 to date)	Mead, NewsNet

* Note:Time span and record count for a given title may not apply to all services that provide that title.

TABLE 7

EXAMPLES OF DATABASES OF COLLECTIONS OF NEWSLETTERS AND PERIODICAL FULL TEXT ARTICLES

DATABASE	NO. OF PUBLICATIONS COVERED	NO. OF ARTICLES INCLUDED
ACS Journals	18	40,000
Computer ASAP	45+	60,000
F-D-C Reports	3	24,000
Health Periodicals Database	60+	22,000
Jane's Defense & Aerospace News/Analysis	10	60,000
Magazine ASAP	130+	220,000
McGraw-Hill Publications Online	30+	150,000
Newswire ASAP (complete text of news releases & wire stories)	3	400,000
PTS Newsletter Database	225+	58,000
Trade & Industry ASAP	400+	730,000

TABLE 8

EXAMPLES OF NEWSLETTER FULL TEXT AVAILABLE FROM CENTRAL ONLINE SERVICES

NEWSLETTER	ONLINE SERVICE
Aerospace Intelligence	DIALOG
BNA Daily Reports	Mead
Catholic Trends	NewsNet
CCH Tax Day: Federal	NewsNet
Defense Daily	DIALOG, NewsNet
Education Daily	NewsNet
Energy Daily	NewsNet
F-D-C Reports	Data-Star, DIALOG
FTC: Watch	NewsNet
Health Grants and Contracts Weekly	NewsNet
Hollywood Hotline	NewsNet
Inside R&D	DIALOG
International Travel Warning Service	NewsNet
Jane's Defence Weekly	DIALOG
Japan High Tech Review	NewsNet
Kiplinger Newsletter	DIALOG
School Law News	NewsNet
Sludge Newsletter	NewsNet
Space Daily	NewsNet
Tax Notes International	NewsNet
Tax Notes Today	DIALOG
U.S. Employment Opp's: Federal Government	NewsNet
Wall Street Monitor	NewsNet

TABLE 9

EXAMPLES OF JOURNAL OR MAGAZINE FULL TEXT AVAILABLE FROM CENTRAL ONLINE SERVICES

JOURNAL	ONLINE SERVICE
American Libraries (1983 to date)*	DIALOG, Mead
Atlantic	DIALOG
Aviation Week & Space Technology	DIALOG, Mead
Byte	DIALOG
Business Week (1975 to date)	Mead
Chemical Week (1975 to date)	Mead
Congressional Record	Mead
Consumer Reports (over 6,000 articles from 1982 to date)	DIALOG
Datamation (1983 to date)	DIALOG, Mead
Economist	DIALOG
Federal Register	DIALOG, Mead
Forbes (1975 to date)	DIALOG
Fortune	DIALOG
Harvard Business Review (over 3,000 articles from 1971 to date)	DIALOG, Mead
Lancet	BRS
McGraw-Hill Publications (over 90,000 articles from 1985 to date from MH publications such as *Aviation Week & Space Technology, Business Week, Chemical Engineering, Metals Week*)	DIALOG

TABLE 9 EXAMPLES OF JOURNAL OR MAGAZINE FULL TEXT AVAILABLE ... (Cont.)

New England Journal of Medicine	BRS
Newsweek (1975 to date)	Mead
Scientific American (1983 to date)	DIALOG, Mead
Sports Illustrated (1981 to date)	DIALOG, Mead
U.S. News & World Report (1975 to date)	Mead

* Note: Time span and record count for a given title may not apply to all services that provide that title.

TABLE 10

EXAMPLES OF SYSTEMS FOR LOCAL USE OF STORED DIGITAL DATA

SYSTEM NAME	CONTENT	PARTICIPATING ORGANIZATIONS
ADONIS	full text of 219 biomedical journals published in 1987-88 on CD-ROM disks sent weekly to major document delivery centers	Academic Press, Blackwell, Elsevier, Pergamon, Springer Verlag, Wiley
Business Periodicals Ondisc	full text from 300 journals abstracted in ABI/INFORM database	UMI, Data Courier
Information Delivery Module (IEEE and IEE publications)	full text of entire collection of IEE and IEEE journals and conference proceedings for 1988, and a complete set of IEEE standards (200,000 pages plus all associated INSPEC indexing on 25-30 CD-ROM disks)	UMI, IEEE, IEE
Laser DISCLOSURE	full text of annual reports, 10-Ks, 10-Qs, proxies, and appropriate exhibits on more than 6,000 publicly traded companies and 4,500 OTC companies (1.8 million pages and about 100 CD-ROM disks to replace fiche)	Disclosure Information Group, Inc.

TABLE 11

POSSIBLE ISSUES WITH POLICY IMPLICATIONS FOR THE LIBRARY OF CONGRESS NETWORK ADVISORY COMMITTEE

- Coordinated assembly and production of image collections of interest to libraries (such as USPTO has done with the U.S. patent collection of over six million patents, and the National Agricultural Library has done with specific publications);
- coordinated national, regional, or network-level planning of location and operation of major on-site document delivery systems such as the ADONIS and UMI systems;
- establishment of a special tariff for library data communications (including fax) that is similar in scope and intent to the current special library postal rate;
- provision in any federally-sponsored data communications network (e.g., the "Gore Network") of means of transmissions of library information;
- negotiation of photocopy or other document delivery licenses for groups of publications (e.g., all Elsevier, Pergamon, Wiley, and McGraw-Hill journals) on behalf of groups of libraries (e.g., FEDLINK, CLASS, AMIGOS);
- review of compensation plans or other arrangements related to net lending ("host-parasite") relationships between libraries (e.g., the extent to which the networks might assume an accounting/collection role for the participants);
- development of specific policy statement regarding library competition with the private sector for document delivery service;
- inclusion of new data field(s) in CONSER and other serial records to describe form and availability of full text in machine-readable or scanned-image form; and
- preparation and distribution of fax number directories associated with ILL or document delivery facilities.

INTERLIBRARY LOAN: CURRENT USE AND PATTERNS

Kate Nevins[1]

Cooperative advances of the last several decades led to both formal and informal resource sharing alliances. New technologies change the methods by which resource sharing is accomplished. An analysis of interlibrary loan (ILL) conducted using the OCLC ILL Subsystem illustrates that current interlibrary loan methods result in steadily increasing resource sharing activity while facilitating ILL between different types of libraries, and the management of ILL on both an intrastate and interstate basis.

This analysis utilizes data reflecting use of the OCLC ILL Subsystem from July 1, 1988 through June 30, 1989. During that period 4,299,325 requests were filled by OCLC member libraries. A few caveats need to be kept in mind when reaching conclusions regarding this ILL activity:

1. ILL activity conducted on OCLC is an undetermined percentage of all ILL activity executed in the United States. The lack of centralization of this function makes it difficult to conduct a true national analysis.
2. No consolidated data on national ILL activity conducted before the introduction of the OCLC ILL Subsystem in 1979 exists. Therefore, this analysis of OCLC ILL growth begins with that year.
3. Knowledge of group usage patterns must be applied to the analysis. Not all Ill groups utilize the OCLC ILL Subsystem in the same way: some use it for the bulk of their ILL activity, others as a last resort only. This is reflected in usage pattern data.
4. This report covers only requests filled using the OCLC ILL Subsystem. Unfilled requests are not included. The 4,299,325 requests filled in 1988/89 are 86% of the requests sent by OCLC member libraries.

While these limitations prevent us from drawing definite conclusions about all national ILL activity, the magnitude of the OCLC ILL Subsystem volume allows for general conclusions. In this paper I will address ILL volume trends, and lending patterns by state and by type of library. Overall, OCLC ILL Subsystem usage is increasing steadily. In the last five years the volume has nearly doubled. See following table.

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[1] Kate Nevins is vice president of corporate relations at the OCLC Online Computer Library Center, Inc. in Dublin, Ohio. This paper is based on a presentation given on November 30, 1989, at the Library of Congress Network Advisory Committee meeting in Washington, DC. The opinions expressed herein are the author's and do not necessarily reflect those of OCLC Inc. The author would appreciate the courtesy of notification of any use or reproduction of this paper.

ILL Subsystem Usage

Year	Transaction*	Change	% Change**
1984/85	2,225,856	-	-
1985/86	2,697,620	471,764	21.2
1986/87	3,199,294	501,674	18.6
1987/88	3,763,320	564,026	17.6
1988/89	4,299,325	536,005	14.2

* = Filled requests
** = "Law of big numbers"

The percentage growth has slowed somewhat, in part, because of the law of big numbers: the larger the base of activity the larger the necessary volume change to sustain the growth rate. However, the ILL Subsystem is still experiencing a solid increase of one half million requests a year. It is interesting to note that this increase has two components: addition of new users to the user base and increased usage by current users. In 1988/89 the user base increased by 7.8% while the overall usage increased 14.2%.

Usage of the OCLC ILL Subsystem provides libraries with the tools to identify needed materials wherever they are located. ILL protocols direct libraries to make use of local and regional resources first, but this is not always possible for infrequently held items. An analysis of OCLC ILL Subsystem usage illustrates that no state is self-sufficient.

The ILL Lending table (page 32) illustrates the interstate and intrastate network of ILL from the period 1987/88. For each state, two figures are given. The first figure indicates that state's percentage of all lending conducted on the OCLC ILL Subsystem. For example, Texas conducted 8.3% of all OCLC-based lending activities. The second figure indicates the percentage of lending which is performed with other libraries in that state. For example, Texas libraries make 67.5% of their loans to other Texas libraries. Just over 32% of Texas' loans are to out-of-state libraries. System-wide, 60.1% of requests were filled by a library in the same state as the requesting library; 39.9% were filled by libraries in different states.

A similar analysis illustrates that libraries grouped together by type do not necessarily form self-sufficient ILL groups. The Inter-Type Lending table at the end of this paragraph describes significant lending patterns by library type. In each case, the type of library group procures materials from other members of this type. However, in no case does it exceed the 56.1% experienced by public libraries.

Inter-Type Lending

Lender	Borrower	Loans	% Total Loans
Academic Research	Academic Research	199,895	25.5
	Academic	309,785	39.6
	Public	85,945	10.9
	Corporate	54,678	6.9
	Federal	31,815	4.0

Academic	Academic Research	164,594	10.9
	Academic	710,883	47.2
	Public	252,873	16.8
	Corporate	65,757	4.3
Public	Academic Research	19,489	4.0
	Academic	76,003	13.9
	Public	305,715	56.1
	State	40,278	7.4
	Municipal	23,191	4.2
	Processing Centers	34,875	6.4
State	Academic Research	5,605	5.5
	Academic	21,573	21.3
	Public	50,659	50.0
	State	4,325	4.3
	Processing Centers	5,404	5.3
Medical	Academic Research	23,016	11.7
	Academic	60,881	30.9
	Public	8,557	4.3
	Corporate	22,963	11.6
	Medical	52,883	26.8
	Federal	12,009	6.1
Federal	Academic Research	10,510	8.6
	Academic	16,454	13.5
	Public	10,559	8.6
	Medical	6,929	5.6
	Corporate	9,678	7.9
	Federal	56,616	46.5

What conclusions do these data lead to? Several obvious ones present themselves: (1) traditional ILL activity is growing steadily and will continue to do so, (2) no geographic region is self-sufficient for ILL purposes, and (3) no library group aligned along type of library lines is self-sufficient.

In addition, this analysis raises several other important issues: (1) emerging resource sharing programs based strictly along geographic or type of library lines should explore linkages in order to fully meet their ILL needs; (2) creation and compilation of bibliographic and location data on a strictly local or regional basis will undermine current resource sharing activities; and (3) national strategies are needed to ensure effective ongoing resource sharing.

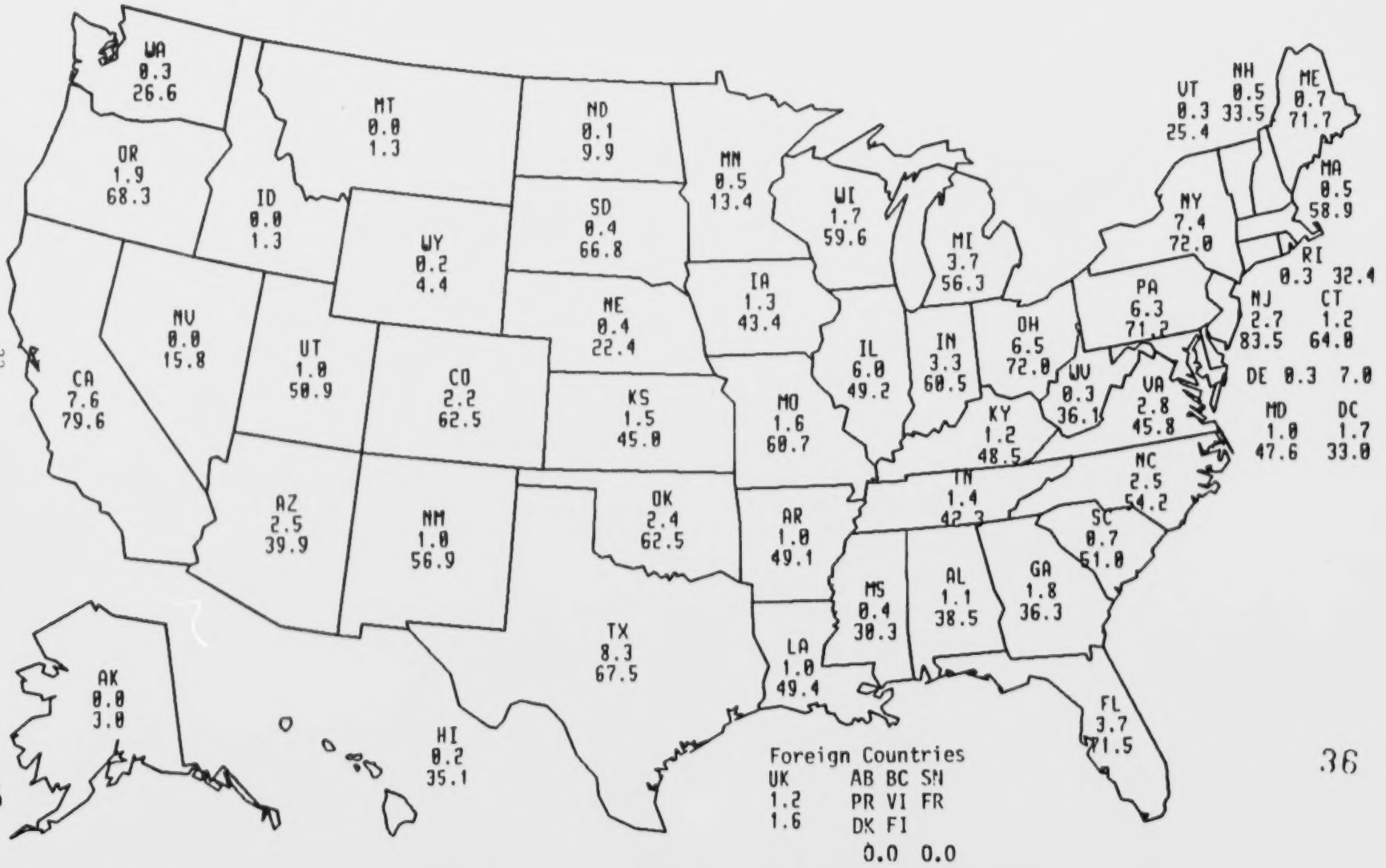
The methods of ILL will change with more widespread use of technologies like telefacsimile and services based on full-text delivery. Whatever the methods, however, we are challenged to continue the strong intrastate, intra-type resource sharing activity which is underway.

FIGURE 1

ILL LENDING

% of Total Loans, % Intra-state

FY 87-88



DOCLINE:
The National Library of Medicine Experience

Lois Ann Colaianni[1]

In the 1950's and 60' users could obtain physical items and photocopies of articles for items not in their library's collection, but it usually was a slow process necessitating weeks or months of waiting. Certainly medical libraries shared resources, but many collections were inadequate and information about where a specific title was held was very sparse. Users could identify relevant sources using printed indexes and abstracting services, but could not obtain the items in a timely manner. The automation of the indexing and abstracting services, so that citations could be found rapidly, served to focus users' and librarians' attention to the problem and emphasized how inadequate interlibrary loan (ILL) services were for health professionals.

In 1959 the National Library of Medicine (NLM) received 78,000 requests for documents, The five most frequently requested titles were:

Lancet
British Medical Journal
American Journal of Physiology
Journal of the American Medical Association
Journal of Biological Chemistry

All are major biomedical titles and should be in a reasonably sized medical library.

NLM was aware of the poor state of medical libraries and, in 1965, the United States Congress formally recognized the importance of libraries in the dissemination of the results of biomedical research by passing the Medical Library Assistance Act (MLAA). In addition to grants for training librarians and developing resources, the MLAA contained money for the development of the Regional Medical Library (RML) Program. With the RML funding, NLM developed a network which today consists of over three thousand medical libraries. One of the major programs in the network has been the improvement of interlibrary loan and document delivery. Collections were expanded to ensure local availability of documents, union lists were developed to locate items easily and resource sharing was subsidized until the early 80's. Thus the infrastructure for effective document delivery in biomedicine was improved substantially using MLAA funds.

The library began to automate the front-end of the interlibrary loan process in the late 70's

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[1] Lois Ann Colaianni is the associate director for library operations at the National Library of Medicine. This paper is based on a presentation given on November 30, 1989, at the Library of Congress Network Advisory Committee meeting in Washington, DC. The opinions expressed herein are the author's and do not necessarily reflect those of the National Library of Medicine. The author would appreciate the courtesy of notification of any use or reproduction of this paper.

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and early 80's. In 1985 after a pilot project in the mid-continental region[2], NLM began a phased implementation of DOCLINE, an automated document requesting and routing system. This past year over eighteen hundred libraries used DOCLINE to request 1.6 million items from libraries in the network. Today, I will describe DOCLINE briefly, including the environment in which it operates and the databases on which it rests, and mention future plans for the system.

First, it is helpful to understand the environment in which DOCLINE was developed. Over eighty-five percent of the documents by medical libraries are articles in journals. A similar percentage of these documents are identified through searching MEDLINE, its Backfiles or HEALTH, a health planning and administration database. The RML network, started in 1965, has a four tiered pyramid structure. Basic local hospitals and special libraries form the foundation with larger, usually academic health science libraries, at the next level. Next to the top are the seven Regional Medical Libraries. NLM is the backup library at the apex. Libraries at each level are encouraged to develop collections adequate to meet seventy-five percent of their users' needs or at least have local access to such a collection. Libraries at each level are encouraged to share with each other in their locale and refer to the next level only those requests they cannot fill. NLM, as the top level, was to be the back-up. Any automated system should attempt to replicate the prevailing ILL patterns. As we all know this may be the goal but such a system cannot avoid changing patterns. A system identifies new weak links in the process and our expectations change resulting in behavioral changes.

Because of the equipment available in many small libraries, DOCLINE was designated to run on virtually any type of (American Standard Code for Information Interchange (ASCII) terminal. It also relied on commercial telecommunication networks for communications. The system was programmed using highly structured code, with programs written in PL/1.

The DOCLINE system uses online links to bibliographic, institutional, and serial holdings information, to route interlibrary loan requests automatically to the lenders reported holding the requested items. NLM wanted to take advantage of the seven million citations already in the MEDLINE and HEALTH databases in order to ensure the completeness and correctness of requests. NLM also planned to use the individual serials holdings information libraries report to NLM through the seven RML's. Currently the holdings database, SERHOLD, contains 1,160,000 records for about 35,000 titles held in 2,850 libraries. The third online link is to the institutional user file. There are 11,000 libraries in the DOCUSER file which includes LIBID, name, address, telephone number, and a table stipulating the libraries to which to send ILL requests. I will describe the routing table shortly.

Eight DOCLINE modules permit users to create requests, check on the status of their requests, receive incoming requests, update requests with the action taken, receive messages, receive statistical reports, and support automatic routing and system monitoring. Inputting a request using the citation number from MEDLINE or HEALTH takes forty-five seconds and inputting a complete citation takes less than two minutes.

Table 2 (page 38) shows the format used to request an item. The user is asked for the LIBID which saves typing name, address, etc., and then the type of item being requested. The system responds to the LIBID with the full name and address from the DOCUSER file. An enter

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[2] A list of the seven regions, the states included in each region, and the Regional Medical Libraries can be found in Table 1 (page 37).

key defaults to a journal article. Similarly an enter key defaults to "photocopy" for the form. If the user types in the unique identifier (the citation number) on the next line, the system responds with the complete bibliographic citation. The user is given the opportunity to verify that this is the item wanted and if so, can quickly step through the management functions. Copyright compliance, patron's name, authorizing individual, "not needed after" date, and maximum cost are to be filled in or the default accepted. There is a field for comments such as "please send by fax." Table 3 (page 39) shows the quick way to enter the same request without waiting for the system prompts in the management section.

Serials that are not on MEDLINE and HEALTH can also be requested; however, the citation is not provided by the system. The request will be routed automatically as are all serials. Monographs and audiovisual requests must be keyed in unless the user has a CATLINE or AVLINE UI. These are usually sent directly to a specific library or NLM as the backup since there are no holdings data in the system for monographs or audiovisuals.

The Routing System is one of the major sections of DOCLINE. Routing has two major components--the holdings database and the routing maps. Only a brief description of SERHOLD is described here. Table 4 (page 40) shows a sample holdings statement in SERHOLD with the holdings reported at Level 3 format. Libraries may report at four levels. The first three are compatible with the 1980 American National Standard for Bibliographic Information Interchange (ANSI) standard at the summary level and the fourth is non-standard Level X. Libraries are urged to report at summary Level 3. Some libraries are changing the level of their reporting and reporting at Level 3 in order to reduce the number of requests they receive for which they do not have the specific volume requested because they reported at Level X. Currently, twenty percent libraries report at Level X and eighty percent at Level 3. Increasingly libraries are converting their holdings to Level 3. Good standards for machine readable holdings data and easy ways to report holdings, are essential.

If a holdings statement is reported in the Standard Level 3, DOCLINE can verify ownership of a title by specific years and volumes. The system matches on volume or year and title. If there is no match, DOCLINE selects another library in the randomized list and begins the matching process again.

The next component of this section of DOCLINE is the routing map which each library completes. The routing map has eight cells. Up to twenty LIBID numbers can be entered into each of the first seven cells; the eighth cell is reserved for NLM. A library can borrow from a maximum of eighty libraries using the automated function of the system. Most libraries put their local libraries in the first five cells. These are the libraries with whom they have reciprocal arrangements often obtaining an item at no charge. Cells five and six are used for resource libraries, the regional library and libraries with special collections such as the Library of the American Hospital Association.

The system checks each request made by a library against the holdings of the libraries in the requesting library's routing map beginning with the first cell after randomizing the list of libraries in the cell. A few libraries are unwilling to allow automatic routing to be used. In response to user demand the system was modified to allow users to send requests to a specific library. This, however, defeats the purpose of an automated system. If no match is found, the system checks the second cell and on through the seventh cell until a match is found. If no match is found, the request is sent to NLM. When a match is found, the request is sent to the library

reporting holding the item. The library has one day to receipt the request or it is automatically routed to another library. The system requires a library to update each request with an action or reroute it.

How is the system performing? There are about fourteen hundred users during the eight hours per day that it is available. Ninety-two percent of the requests input in DOCLINE are filled; ninety-nine percent at or before the third route. Eighty percent are filled on the first route. Librarians are enthused about the system and report a reduction in ILL staff time per request and a reduction in the time to obtain an item. A secondary result is an increasing number of requests since they come in a more timely fashion. A network library together with NLM have provided a search and the document for patient care from Idaho to Bethesda and back in less than forty-five minutes using facsimile[3].

Each library receives a management report of the titles requested. These are useful in determining which titles to acquire.

Ten to eleven percent of the requests are routed to NLM. Often these are new titles not yet reported in holdings lists. Holdings are now being updated two times a year. The top five titles this year were:

1. *Nursing Standard*
2. *AIDS*
3. *Professional Nurse*
4. *OR Manager*
5. *Functional Neurology*

This is a remarkable change from 1959. None of these are common titles. None of these titles were in the top five last year.

As with any developing system there are plans for the future. Some libraries want software to do billing, although many libraries will not pay and want the routing stopped if the document will not be supplied at no charge. A significant future change is to permit health professionals to order documents directly after searching a NLM database with GRATEFUL MED. This is very important for those who are in rural locations and unaffiliated with a library. An improved way is needed to route requests only to the libraries that have fax capabilities.

Our users enthusiastically make suggestions so we don't lack ideas for the future. It is their system. They request and fill most of the loans. DOCLINE has been an excellent system for biomedical librarians to request documents very quickly and easily. It has substantially reduced the time it takes to obtain a document, an important service for health professionals.

Reading List

1. Dutcher GA. DOCLINE : A national automated interlibrary loan request routing and referral system. Information Technology of Libraries. In Press.
2. Lacroix EM, Dutcher GA. A comparison of interlibrary loan requests received by the National Library of Medicine: 1959 and 1984. Bull Med Lib Assoc 1987 Jan; 75(1):7-13.
3. National Library of Medicine. DOCLINE Manual. Bethesda; 1989.

[3] The terms "facsimile," "telefacsimile," or "telefacsimile transmission" will hereinafter be cited as "fax."

TABLE 1

REGIONAL MEDICAL LIBRARIES

1. Greater Northeastern Regional Medical Library Program
The New York Academy of Medicine
2 East 103rd Street
New York, NY 10029
Phone: 212/876-8763
FAX: 212/722-7650

States served: Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Puerto Rico.
ONLINE CENTER for Regions 1 and 2.

2. Southeastern/Atlantic Regional Medical Library Service
University of Maryland
Health Sciences Library
111 South Greene Street
Baltimore, MD 21201
Phone: 301/328-2855
800/638-6093
FAX: 301/328-6093
States served: Alabama, Florida, Georgia, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia, District of Columbia, Virgin Islands.

3. Greater Midwest Regional Medical Library Network
University of Illinois, Chicago
Library of the Health Sciences
P.O. Box 7509, Chicago, IL 60680
Phone: 312/996-2464
FAX: 312/942-1951
312/733-6440
TELEX: 206243
States served: Iowa, Illinois, Indiana, Kentucky, Michigan, Minnesota, North Dakota, Ohio, South Dakota, Wisconsin.

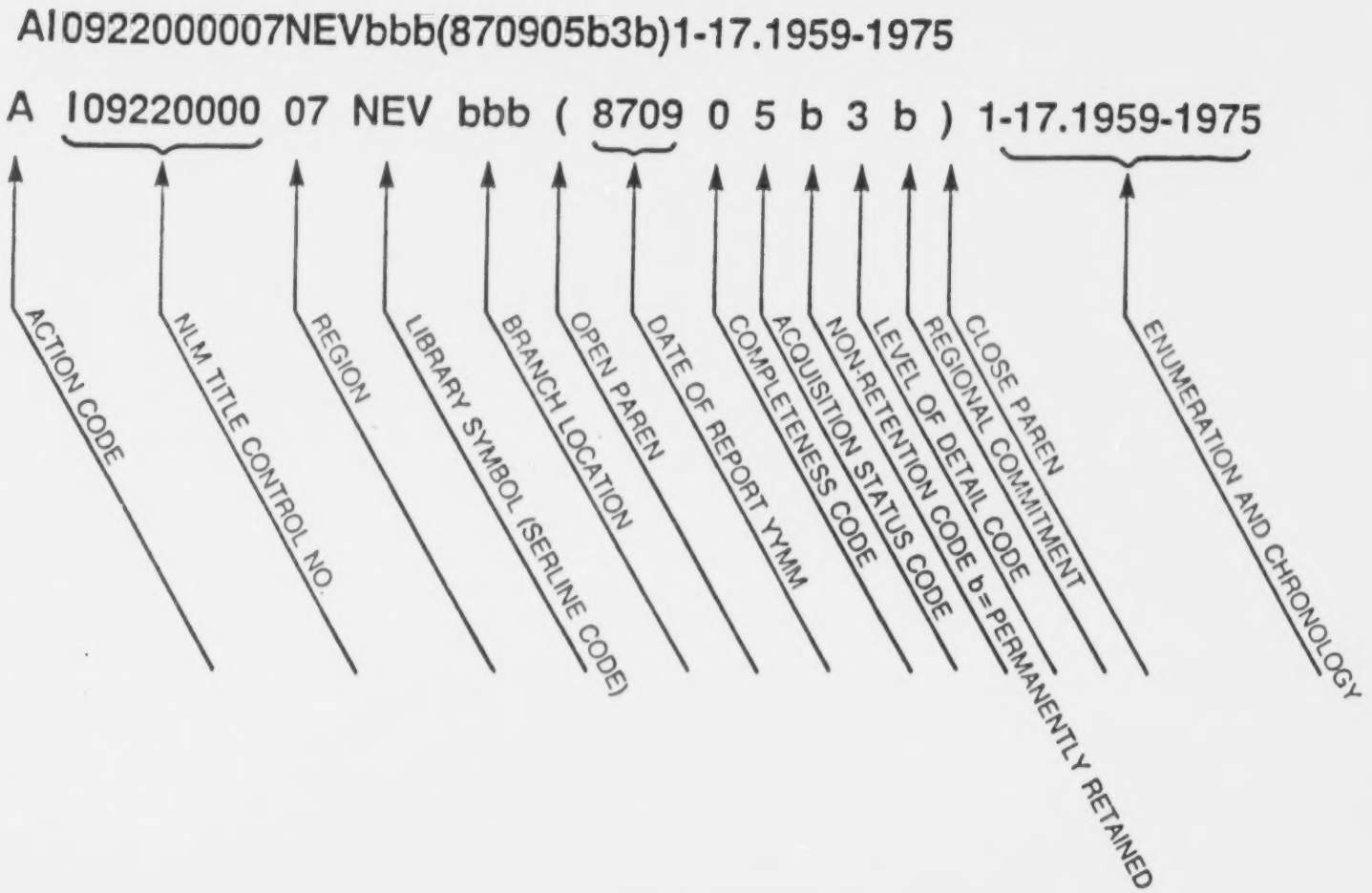
4. Mid-continental Regional Medical Library Program
University of Nebraska
Medical Center Library
42nd and Dewey Avenue
Omaha, NB 68105-1065
Phone: 402/559-4326
800/MED-RML4
FAX: 402/559-5498
States served: Colorado, Kansas, Missouri, Nebraska, Utah, Wyoming.
ONLINE CENTER for Regions 3, 4, 5.

5. South Central Regional Medical Library Program
The University of Texas
Southwestern Medical Center, Dallas
5323 Harry Hines Boulevard
Dallas, TX 75235-9049
Phone: 214/688-2085
FAX: 214/688-3277
States served: Arkansas, Louisiana, New Mexico, Oklahoma, Texas.

6. Pacific Northwest Regional Health Sciences Library Service
Health Sciences Library and Information Center
University of Washington
Seattle, WA 98195
Phone: 206/543-8262
FAX: 206/543-8066
States serves: Alaska, Idaho, Montana, Oregon, Washington.

7. Pacific Southwest Regional Medical Library Service
Louise Darling Biomedical Library
University of California
10833 Le Conte Avenue
Los Angeles, CA 90024-1798
Phone: 213/825-1200
FAX: 213/206-8675, ONTYME: PSRMLS
States served: Arizona, California, Hawaii, Nevada, U.S. Pacific Basin Territories.
ONLINE CENTER for Regions 6 and 7.

TABLE 2


AI0922000007NEVbbb(870905b3b)1-17.1959-1975
A I09220000 07 NEV bbb (8709 0 5 b 3 b) 1-17.1959-1975
ACTION CODE
NLM TITLE CONTROL NO.
REGION
LIBRARY SYMBOL (SERLINE CODE)
BRANCH LOCATION
OPEN PAREN
DATE OF REPORT YYMM
COMPLETENESS CODE
ACQUISITION STATUS CODE
NON-RETENTION STATUS CODE
LEVEL OF DETAIL CODE b=PERMANENTLY RETAINED
REGIONAL COMMITMENT
CLOSE PAREN
ENUMERATION AND CHRONOLOGY

42

43

TABLE 3

Request for Journal Photocopy Using MEDLINE UI

DOCLINE SYSTEM "BORROW" REQUEST

LIBID [23456Y] > [enter]
TYPE (J,M,A) [J] > [enter]
FORM (P,L) [P] > [enter]
MEDLINE/HEALTH UI > [enter]
TI: Cryptosporidiosis in the acquired immune deficiency syndrome.
AU: Cooper DA ; Wodak A ; Marriot DJ ;
SO: Pathology 1984 Oct;16(4) :455-7

IS THIS CORRECT? (Y,N) [Y] > [enter]
Citation accepted.
CC (G,L) > g
REFERRAL REASON > lac
PATRON > Dr. Duke
AUTHORIZED by: > mtc
COMMENTS > [enter]
NOT NEEDED AFTER > 890228
MAX COST > 8
ROUTING PREFIX > [ENTER]
MAX ROUTES PER CELL [20] > [enter]
SHIP TO NAME > [enter]

TABLE 4

Request for Journal Photocopy Using MEDLINE UI and High-Speed Data Entry

DOCLINE SYSTEM "BORROW" REQUEST

LIBID [23456Y] > [enter]
TYPE (J,M,A) [J] > j/p/85112222 (or //85112222)
TI: Cryptosporidiosis in the acquired immune deficiency syndrome.
AU: Cooper DA ; Wodak A ; Marriot DJ ;
SO: Pathology 1984 Oct;16(4) :455-7

IS THIS CORRECT? (Y,N) [Y] > [enter]
Citation accepted.
CC (G,L) > g/lac/dr. duke/mtc//890228/8////

DOCUMENT DELIVERY SYSTEMS AT THE UNIVERSITY OF CALIFORNIA: An Overview

Dennis Smith and Clifford A. Lynch[1]

Abstract

This paper focuses on document delivery systems currently in operation on the individual campuses of the University of California (UC). It describes the current status of the document delivery systems and the direction that we plan, or hope, to take in the future.

Introduction and Background

In preparing for this paper, I was struck by the complexity of the current UC systems in operation. There are nine UC campuses, ranging over about 800 miles, from Davis in the north to San Diego in the south. The campus population approximates 160,000 students and 8,000 faculty. Altogether, the University has over 125,000 employees.

Among the nine campuses are 110 libraries and two regional storage libraries (North and South), with a state supported operating budget of over $150 million. Of the nine Association of Research Libraries in the State of California, seven of them are UC libraries. I think you can understand that whenever a generalization is attempted in describing any UC operation, some factor can usually be found to prove it wrong. For this paper I will focus on the highlights of the systems at UC Berkeley, UC Irvine, UCLA, UC San Diego, and the regional storage libraries. I will also describe two system-wide projects for which document delivery is key to their success.

Early Experiments with Document Delivery

As Charles Bourne mentioned, the first attempt we know of to deliver documents using state-of-the-art telefacsimile[2] equipment dates back to 1966/67. An experiment was conducted for

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[1] Dennis Smith is the director of library affairs at the University of California in Berkeley. Clifford A. Lynch, director of library automation at the same institution, co-authored the following paper. This paper is based on a presentation given by Mr. Smith on November 30, 1989, at the Library of Congress Network Advisory Committee meeting in Washington, DC. The opinions expressed herein are the authors' and do not necessarily reflect those of the University of California. The authors would appreciate the courtesy of notification of any use or reproduction of this paper.

[2] The terms "facsimile," "telefacsimile," or "telefacsimile transmission" will hereinafter be cited as "fax."

one month between the Berkeley and the Davis campuses, using fax equipment in a working library situation. Transmission was in one direction only, from the Berkeley library to the Davis library. The major portion of the transmission consisted of copies of journal articles from volumes in the Berkeley library which were requested by faculty members on the Davis campus.

The results of the experiment were far from encouraging for the libraries. It was concluded that the use of fax, in 1967, was expensive, time consuming, and generally unreliable because of the state of development of the equipment. Quality of reproduction was awful. One unforgettable incident occurred during this experiment. A demonstration was arranged for the Chancellor of the Davis campus to wait at the receiving station while a copy of one of his articles was being sent via fax from Berkeley. Dignitaries were assembled at both ends of the system. The fax machine leapt to life and began printing. As the paper started to unroll (remember that this equipment is now over twenty years old), the cutting bar sprang into action and shredded the article into thin paper strips before the bemused Chancellor and distinguished onlookers. It was a good many years before anyone at UC could even mention fax and document delivery in the same breath.

The UC Berkeley Baker Program

The first UC campus library to provide a systematic, publicized document delivery service was Berkeley. The University system-wide administration was surprised by an allocation of $200,000 in the 1973-74 Governor's Budget to improve access to library resources at the Berkeley and Los Angeles campuses for both University-affiliated users and other users. Berkeley decided to use some of these funds to launch a new service called "Baker," (the campus phone number for requesting this service, i.e., 64-BAKER). This service has evolved through the years, expanding both its user base and its methods of access to Berkeley's highly decentralized library collection.

Baker is a fee-based document delivery and bibliographic verification service available to UC Berkeley faculty, graduate students, and staff. It offers four types of services: (1) delivery of library books and photocopies to a user's campus mailbox (at $2.50 per item requested); (2) verification of citations using local and national catalogs and standard bibliographic works (at $1.50 per citation); (3) Interlibrary Borrowing Service (that is, if the material is not available at UC Berkeley, Baker will provide the patron with the complete bibliographic information necessary for requesting material through interlibrary loan (ILL)); and, (4) placement of the request with ILL, including subsequent delivery of the material to the patron when it arrives (at $2.50 per item). Requests for Baker Service can be made through electronic mail, through campus mail, and by phone. As a Baker user myself, I can only say that this is a wonderful service, and wish that it had been available when I was a student.

The Berkeley library also offers fax service through its interlibrary borrowing department (but not via Baker and not to its own campus); the library points out that the service is labor intensive, expensive, and therefore not encouraged. The average price of $15 per request includes the phone line charges and transmission for up to fifteen pages. Despite these rather significant charges, Berkeley sends material via fax all over the world.

Cooperative Agreements between UC Berkeley and CSU Chico

About a year ago, UC Berkeley entered into a one-year experimental agreement with the California State University (CSU) at Chico to provide rush fax service for Chico faculty and students. Chico provided the Berkeley library with a Group III Canon FAX-1920 plain paper fax

machine and funding for one student employee to provide rush retrieval of library materials. Berkeley agreed to guarantee four- to eight-hour turnaround time for up to five requests per day, with a limit of fifty pages per request.

Berkeley library staff point out that one of the disappointments with the fax machine was the direct book copying feature, which Berkeley had expected to use to save time. It was found that the scanning speed of the machine was too slow, so the campus continues to photocopy articles first, and then fax the photocopy.

The Chico library has indicated that the project has been very successful (there have been 309 filled fax requests from November 1988 through June 1989; 2,908 pages sent per fax). Project funding has been extended for a second year after endorsement by the faculty. The Berkeley library staff has concluded that Group III machines are acceptable for rush requests, but that the technology (at least as manifested in the Canon machine) is neither sufficiently advanced nor sufficiently cost-effective to handle large-scale daily use.

The UC Irvine MELDOC System

UC Irvine began a document delivery service in January of 1986, which is based on Berkeley's "Baker" service.

In December of 1988, the Library's Document Delivery Service sent a questionnaire to all UC Irvine faculty with the dual purpose of promoting the electronic use of document delivery and ILL programs as well as identifying any faculty concerns. A number of faculty members asked for a way of linking the MELVYL[3] catalog with document delivery and ILL.

In September 1989, MELDOC, a computer program written in the language "C," was installed. Local electronic mail users at the UC Irvine libraries are now able to search the University's MELVYL online union catalog, to request delivery of library materials, ILL, and journal articles from MELVYL MEDLINE[4]. The result is an overwhelming success.

MELDOC represents a giant step forward in rapid delivery of materials to the library patron. Previously, users had to search the MELVYL catalog, physically write down notes listing authors, titles, and call numbers for every book and journal, and then log off the catalog. MELDOC eliminates the need to do all this. Library patrons can now request material without leaving the MELVYL system.

At UCLA, document delivery service is only partially implemented. For the last year, a library committee has conducted an intensive review with the objective of extending the service to all of the campus libraries.

Planning for the extension of this service at UCLA has proven to be a difficult and time consuming task. The issues or problems that are being considered by the planning group for the

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[3] MELVYL is a registered trademark of The Regents of the University of California.

[4] MELVYL MEDLINE is also a registered trademark of The Regents of the University of California.

campus-wide document delivery system are:

1. The campus must determine who falls into the on-campus category of library user and who does not.
2. The campus must register users to assure their eligibility, define user class, and guard the campus against bad debts.
3. Users must be made aware of copyright rules and must indicate they will obey them by signing a compliance statement.
4. The campus must agree about which materials are to be made available for delivery.
5. The campus must decide on centralized or decentralized service. UCLA has four ILL centers and nineteen separate libraries. The service could be centralized in one location, or performed by the four ILL centers, or performed by all nineteen branches.
6. The campus must decide on the fees to be charged. As we know, estimates of costs for supplying document delivery service vary widely among campus libraries.

These issues are basic, but when they are focused on a library system as large as UCLA's, it takes a great deal of planning before a document delivery system can be implemented.

I will turn now to a description of specialized document delivery at UC. At San Diego, the Center for Magnetic Recording Research (CFMRR) wished to provide rapid and responsive service to a specialized clientele while avoiding unnecessary duplication of expensive science and engineering collections. The result was a library with a narrowly focused working collection, augmented by the extensive use of electronic mail and fax to request and receive documents from other libraries and international suppliers alike. To obtain Japanese materials, CFMRR has established working relationships with several Japanese institutions and with the British Library. Typically, electronic mail services are used to place requests with overseas correspondents, and materials are usually delivered by mail or commercial courier, although fax is used occasionally.

At the Central University Library at the same campus, the implementation of a new document delivery service is motivated by a different concern: the desire to maintain services to collections which will have limited access while extensive construction and renovation takes place. Similarly, UC Berkeley wished to minimize the impact of temporarily storing two-thirds of its biological sciences collection at an off-campus site during construction and renovation of its library. The library's response to this problem was to enhance its BAKER service by creating a document-ordering facility for GLADIS, UC Berkeley's online catalog.

UC System-wide Document Delivery Projects

I would like to describe two of the system-wide projects which employ document delivery systems. These projects are moving forward because of two objectives: first, improved use of the University's library materials budget; and second, serious coordinated collection development among the nine campuses.

The increase in the price of journals and the effect on library budgets is well-documented in the literature. I will just point out that, even with a University wide library materials budget of over $35 million, some of the campuses have experienced a decline in serial subscriptions for the first time.

This has prompted the campuses to cooperate in some unique effort on behalf of collection development. The science and engineering libraries of the UCLA, Santa Barbara, and San Diego campuses started a pilot project in August of this year to coordinate journal cancellations and acquisitions. Access to the three collections is enhanced by direct transmission of journal articles via fax. The impact and costs of the trade-off between acquisition and access is being monitored closely. Specifically these libraries have: (a) developed a formal written coordinated collection development agreement which identifies areas of primary collection responsibility for each library; (b) consulted with each other in advance of all serial acquisition and cancellation decisions; (c) begun to develop and maintain a database of serial acquisition and cancellation decisions; (d) developed and implemented a plan to transmit journal articles via fax; and (e) begun to evaluate costs and workload associated with these activities.

A similar pilot study is underway on shared access to Soviet and Chinese translation journals in science, engineering, and medicine which involves all of the UC campuses as well as Stanford University. The rationale for focussing on this category of journals is that they are expensive and, for the most part, not believed to be heavily used. Similar projects are being planned in other subject areas.

Regional Storage Libraries

At the Northern and Southern Regional Libraries (NRLF and SRLF), document delivery systems are vital to their operations. The northern facility is about seven miles from the Berkeley campus in Richmond, California, and the southern facility is on a remote location of the UCLA campus. Eventually, over eleven million volumes of lesser used materials will be stored in each of these facilities. Remote lending of these deposits, therefore, has to be as simple and direct as possible. UC libraries need not use formal ILL procedures to borrow regularly circulating material for their library patrons. For lending purposes, the facilities are considered the "holding" or "circulating library" for material requested, regardless of the depositing library. For example, in FY 1988-89, the NRLF provided fifty-one thousand items or photocopies of articles in response to patron-related requests, and fifteen thousand items to libraries for non-patron-related uses. Of requests received, fifty percent were by fax; forty percent were by courier, five percent were by electronic mail; and five percent were by telephone.

Both of the facilities makes heavy use of fax machines because we have found that it is much cheaper for the storage facilities to send journal articles by fax than to send the bound journal to the requesting library. It inflicts less wear and tear on the collection, and access and delivery of the requested item is greatly facilitated. The fax machine was vital to the northern facility after the October 17, 1989 earthquake. Normally, the NRLF did not send articles of more than fifty pages by fax, but this restriction was waived because the inter-campus bus service was discontinued to the San Francisco Medical Center while the Bay Bridge was being repaired and to UC Santa Cruz while Highway 17 (the main route to Santa Cruz) was closed due to massive landslides. (During this period, UPS delivery took as many as three to six days between Berkeley and the San Francisco Medical Center).

Having covered the history and current status of the document delivery systems at the UC campuses, I will now discuss the future of document delivery at UC. These plans are the result of extensive collaboration between UC's Office of Library Affairs and the Division of Library Automation.

Automating Document Delivery Requests

The MELVYL union catalog contains records for over ten million monographic holdings (or over five million titles), the California Academic List of Serials (which as over 1,200,000 holdings, or 641,000 titles), and the last three years of the National Library of Medicine's MEDLINE database.

A prototype document requesting facility in the MELVYL catalog is planned for implementation in 1990. A user, having identified a book or journal article, will be able to issue a REQUEST command, and will then be prompted for his or her document delivery affiliation and account in that system. At this point, for campus document delivery systems that support the appropriate protocols, the MELVYL system will query a campus document delivery registry server across the network to validate the account number and to obtain a default delivery address. This will be displayed to the patron at the MELVYL terminal to allow entry of any special delivery instructions. Once the patron has provided this information, the MELVYL system will generate electronic mail to the mailbox of the campus document delivery system; this electronic transmission contains the citation for the material being requested and the user delivery information.

This type of automated document request feature has raised the interesting new issue of user authentication. In the existing systems it is simply assumed that the requestor is really who he or she claims to be, and that nobody is delivering the document equivalent of thirty-two pizzas to someone else as a practical joke. When documents are requested through the MELVYL catalog, which does not identify or authenticate users except when UC-licensed proprietary databases are being searched from off-campus locations, ID is a source of some concern.

We expect to prototype this system in late 1990 with UC San Diego, and will probably extend it to at least some other campuses rather quickly, though probably without account number authentication.

We plan to document the prototype methodology extensively. It is our hope that this system could serve as the model for many systems around the country from which to originate document delivery requests for material located through that system to any number of delivery services.

In the longer term, this seems like fertile ground for standardization activities. Initially, we intend to transmit eye-readable citations. The standards work in this area promises to be quite complex. For example, there is the question of how a document delivery standard would relate to the current work on ILL protocols within the International Standards Organization (FEY).

A related area of considerable concern that we are just beginning to explore is links to commercial, as opposed to campus-based, document delivery services. For example, we soon will be mounting the Current Contents file produced by the Institute for Scientific Information (FF). One issue raised by the inclusion of this file is its coverage of foreign periodicals, which in some cases are sent by air mail to FF and appear in Current Contents long before most libraries have the material available for access and delivery. In these cases, one of the most viable means for a patron to obtain a copy of the article quickly is to use the FF "tear sheet" service (as offered with printed Current Contents) to get a copy of the article from FF directly for a fee. We would like to offer access to these kinds of services as part of the MELVYL document delivery requesting interface.

Automating Delivery

Today, books or journal articles are delivered either to the end user's fax address directly, or to the requesting library when the document delivery request has resulted in an ILL transaction. There are any number of problems with this latter method. Some of these problems have been mentioned previously. One problem in particular deserves to be highlighted.

Except for a few Group IV machines, fax technology exploits the switched (dial) telephone network. This is frustrating, since UC, like most major universities, has invested and continues to invest millions of dollars a year in advanced, high-speed packet-switched networks. Even the few fax machines that can attach to networks want to communicate using X.25 communication protocols, whereas most campus local area networks are based on Fm technology and the University as a whole is linked primarily with the Transmission Control Protocol/Ph Protocol (TCP/IP) protocols, which "knit together" the complex network of networks found on most campuses and certainly in the inter-campus and broader national environments. Eventually, we will want fax machines to link to networks using the emerging Open Systems Interconnection (OSI) communications protocols (including the ability to transit gateways). Thus far, we have not found fax machines that can operate in a TCP/IP environment.

To address this problem, UC is investigating the development of a gateway system that would allow Group III and Group IV machines to pass across the Ph (over dial up lines) by communicating with local gateway computers. The gateways would accept calls to send fax across the Ph, and would initiate calls to deliver fax from the periphery of the Ph nearest the receiving fax machine. There are many technical problems in this area, but they cannot be covered in this paper. I will mention, though, that we are preparing a Higher Education Act (HEA) Title II-D grant application in conjunction with several UC campuses and other institutions to support work in this area. Several other institutions and corporations, including the Ohio State University and NetExpress, are also doing related work.

Totally Automated Document Delivery

Ultimately, one would like to be able to satisfy a large number of document requests immediately, without any human intervention. Accomplishing this requires the availability of databases containing the source documents. A full consideration of the issues in this area would take us far afield, and would require a much longer paper. However, a few points should be made.

There are three sources for databases containing source documents. We can create them ourselves, for existing and historical material, by making images of the paper copies. Or we can license files from publishers (or perhaps even authors) that contain journal articles in some type of machine-readable form. Finally, the publishers could offer these databases as network resources that could be accessed by the computer system running the MELVYL catalog.

The major issues in the first case--UC-created image databases--include the cost of scanning, deciding what to scan, the costs of storing and transmitting the scanned images, and, perhaps most importantly, copyright considerations. To many librarians, it appears that we cannot legally scan the most frequently requested material since it is protected by copyright. This is a problem that renders technical and cost considerations almost moot. The second case--acquisition of material in electronic form--is complicated by the dearth of sellers of such material, lack of standards about transmission formats, and, again, by the huge number of publishers with whom UC

might potentially have to come to agreement in order to obtain a useful base of material to offer for delivery. Costs for this approach are unclear since so few journals today are available in electronic form. The third option--publisher journal article servers--is even more difficult to evaluate. They simply do not exist. If they did exist, costs
and transmission formats would certainly be important questions.

To be sure, UC is most interested in creating major textual or image databases to provide direct access to major journals for its community. But, as summarized above, we face major problems in these areas, and we do not expect to see anything beyond pilot projects for the next few years unless some completely unexpected change in the environment occurs.

Finally, I would like to point out that there is one unmistakable conclusion that can be drawn from the material presented today. Each UC campus is moving forward in its own way to address its own priorities and solve its own problems.

New document delivery services and technologies are being adopted and expanded at an ever-increasing rate. It is also true that improved technology affords us new opportunities to solve long-standing problems and upgrade existing services. Whatever the reason, it is obvious that the campuses are willing and eager to make use of these technologies.

It is evident that these developments are all moving toward the same goal: the use of document delivery service and technology to deliver primary information directly to library users, wherever they may be.

APPLICATION OF TECHNOLOGY IN DOCUMENT DELIVERY:
The CISTI Experience

Margaret Y. Walshe[1]

CISTI, a division of the National Research Council Canada, is the Canada Institute for Scientific and Technical Information. CISTI's mandate is **"to promote and provide for the use of scientific and technical information by the people and Government of Canada to meet Canadian needs for economic, regional and social development."** One of the largest departments within CISTI is document delivery; responsible for the provision of documents on loan in hard copy or fiche, or locations for materials not held by CISTI.

The major clientele group served by CISTI is the industrial sector which constitutes fifty percent of its community. In document delivery, the user community includes industry (forty-two percent), government (twenty-seven percent), academia (nineteen percent) and hospitals (twelve percent).

The growth in demand for CISTI's document delivery service has been remarkable over the last ten years. In 1978/79 the section handled 136,062 requests; an average of 544 per day. The section now manages about 1,700 requests per day. It is only the extensive use of automation that allows us to manage such high volume.

The introduction of electronic mail systems has allowed for the efficient receipt of the high volume of requests. The increased popularity of this technology over the years is demonstrated in the following chart.

Requests received

	1974/75	1987/88
By mail	65%	20%
By telex/EM	25%	75%
By telephone	10%	5%

[1] Margaret Y. Walshe is the Director of National Services at the Canada Institute for Scientific and Technical Information (CISTI) at the National Research Council Canada. This paper is based on a presentation given on November 30, 1989, at the Library of Congress Network Advisory Committee meeting in Washington, D C. The author would appreciate the courtesy of notification of any use or reproduction of this paper.

However, a program developed at CISTI, automated call numbering[2], realized more significant time savings in the work flow of order processing. Studies conducted on all work flow in the section revealed that between thirty to thirty-five percent of human resource was dedicated to matching incoming requests to the location of the journal issue in the collection.

Orders are received in the Document Delivery Section at CISTI, in four ways: (1) telephone requests transcribed in real-time to a database; (2) structured requests received from public electronic mail networks such as ENVOY.100; (3) database connected orders from Scientific and Technical Information (STI) databases residing on our online retrieval system CAN/OLE[3]; (4) structured electronic requests received from our line retrieval system CAN/OLE; and (5) electronic requests generated from our online monograph, reports, and serial databases.

In the automated call numbering process the software isolates five or fewer elements from each electronically placed request. These include the book or journal title, book or report author, International Standard Book (ISBN), International Standard Serial (ISSN), and Dewey Decimal (DDN) numbers, Coden designations from STI databases, and publication type (i.e., journal, report, book, etc.) These elements are then run against databases which reflect the shelf addresses or call numbers of the collection.

Over the years CISTI worked towards increasing the match and accuracy rate of the procedure. In July 1985, of the thirty-three percent matched entries, ninety-two percent were matched correctly. In May 1989, fifty-three percent were matched, with ninety-seven percent correct matches. Recently a further enhancement of the procedure to CAN/DOC[4] now obtains a match rate of seventy-five percent, with a ninety-nine percent accuracy.

What kind of staff savings were realized? Nearly three person years or five percent of our document delivery resource has been saved by implementing this procedure. Our turnaround time from the time the request is received to the time it leaves the building is ninety-two percent within two days (seventy-three percent within one day), due in large part to the efficiency of automated call numbering.

In addition to using automation extensively at the front end of the document delivery process, CISTI is now investigating greater use of automation to the delivery systems. Recently,

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[2] The term "automated call numbering" is used for call numbers which identify each item within a collection and locate those items on the shelf. At CISTI, an automated process was developed whereby incoming requests are matched against CISTI's automated catalogues which contain all the call numbers. These matched requests then go directly to the appropriate shelf area.

[3] CAN/OLE is the Canadian Online Enquiry Service, a bibliographic access and retrieval system which was developed by the National Research Council and allows document orders to come in through two ways: one, to access the database, find the item wanted and issue an order command; two to use CAN/OLE for document ordering and just access the system and place an order, even if the item is not identified in a database. This is the "Doc" feature.

[4] CAN/DOC is the online ordering feature of CAN/OLE. The user accesses a database on CAN/OLE, identifies the item within the database that has been accessed and orders the item automatically.

we introduced a telefacsimile[5] service in document delivery. This method of delivery will be an addition to the existing delivery services which include the Canadian Postal Service, a special bulk delivery service called Priority Post, LDS[6], and two special university delivery services.

The fax technology has been around for many years, and indeed has been used in exceptional situations in response to urgent need, but it has not received widespread acceptance in the library community as a means of delivering documents, until recently. However, technical developments have brought the cost of equipment down, reduced transmission time (and hence costs), and improved the product, making fax a viable alternative.

CISTI's Fax Trial

In response to growing interest from our client community, CISTI undertook a fax trial in 1988. The trial objectives were to assess the impact of introducing a fax service on document delivery operations and document delivery. Therefore, the trial was designed to determine the service implementation impact; both on internal operations and on clients. Through a structured trial with nine clients situated in different regions of the country, data was gathered over a seven month period on costs, reliability, quality, benefits, and potential volume.

A Ricoh Rapicom 610 was leased. This equipment came with some standard fax features such as delayed transmission, 60 page storage capacity, a 30 page feeder and the capability to transmit via a data or packet switching network like DATAPAC[7].

What were some of the findings? With the Group III machine, it took 1.08 minutes to transmit a single page; 10.34 minutes to transmit a complete order. Reliability of the equipment was no problem. There was some difficulty with quality; twelve percent of the copies sent were poor, one percent unusable. Half tones were the most problematic. The delivery time was very good - our average during the trial was two days, whereas with other delivery services running in parallel, delivery time ranged from four to ten days on average.

Costs for the trial were slightly skewed due to regional differences and the labor used during the trial. This chart provides some data on costs.

Transmission cost	$ 0.00 - 0.53 per minute
Equipment cost	$3,770.00 per year
Line cost	$ 456.00 per year

Service Implemented 1989

Armed with our trial experience and results, a service was designed, which would combine an understanding of client needs and the ability to absorb the added workload at a reasonable cost to the user.

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[5] The terms "facsimile," "telefacsimile," or "telefacsimile transmission" will hereinafter be cited as "fax."

[6] LDS is the library delivery service. This is a special Federal Government [Canadian] mail delivery service.

[7] DATAPAC is a commercially available telecommunications system.

A limitation to the service is that not every request for fax delivery can be treated as an urgent request. Fax would be considered simply an alternate delivery method. Processing such requests to point of delivery would remain the same. A two-step procedure of photocopying on a high speed copier and then utilizing an automatic document feeder for scanning and storing the pages for unattended after-peak-hours transmission would be the least labor-intensive and result in transmission cost savings.

Even with improved transmission times on Group III equipment, the average one-minute-per-page was aggravatingly slow. To take full advantage of off-peak hours, machines could easily be running all night to handle future anticipated volume.

The service began with two machines - one on each of the busiest serial stack floors. This is proving adequate for the demand thus far. Clients continue to associate fax delivery with urgent requests and since a strict limit on the number of urgent requests handled is imposed, the volume of fax transactions is kept artificially low. It is currently twelve hundred pages per month, or ten requests per day. Previously, clients were delighted with two day delivery on urgent requests - now they expect same day response time.

The Future

CISTI looks forward to investigating the potential of fax technology. Group IV fax technology is on the horizon. CISTI hopes to undertake a trial in the coming year using this technology which promises to solve resolution problems and drastically reduce transmission time. CISTI looks to participate in a trial with a heavy volume organization. Any future developments in this enhanced technology will be closely monitored.

A further enhancement would be the receipt of requests by fax and the automated application of call numbers for these requests. CISTI will also look at new developments in telecommunications technologies to assist in providing better service to the Canadian scientific community.

INFORMATION ON DEMAND:
Information Broker Services--the IOD Experience

Christine Maxwell[1]

It would be difficult to overestimate the importance of the issues being considered by the Library of Congress' Network Advisory Committee. In light of that statement, I would like to say that I am very honored and pleased to have been asked to address this meeting. Honored, because I consider networking to be the one of most current, vital issues in information and, as the Network Advisory Committee to the Library of Congress, you represent the "state-of-the-art" of information networking. I'm pleased, because you decided to include the experience of a private sector information broker in today's presentations, an inclusion which I find to be both appropriate and timely.

In the past, this committee has held sessions on Document Delivery, Electronic Information Delivery Systems, and Public/Private Sector Interactions. My remarks today will touch on all of these subjects, but will focus on the area of new technologies in document delivery. Special emphasis will be placed on the immediate impact of these new technologies on commercial document delivery services such as Information on Demand and on what further developments can be expected, both near and long-term.

The Demand for Document Delivery

The ever-increasing demand for specific documents has historically been fueled by new technologies. The perfection and commercialization of xerography in the 1960's led to the provision of cost efficient, widespread, rapid dissemination of photocopied information. Only a few years later, phenomenal increases in the availability and sophistication of bibliographic databases came along to inform us that there were mountains of relevant information "out there" on our subject of choice.

Knowing that the information exists, and having the means to obtain an instant copy are

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[1] Christine Maxwell is a Director of Information on Demand, Inc. (IOD), located in McLean, Va. and President of Research on Demand (ROD), located in Berkeley, California. This paper is based on a presentation given on November 30, 1989, at the Library of Congress Network Advisory Committee meeting in Washington, DC. The opinions expressed herein are the author's and do not necessarily reflect those of Information on Demand. The author would appreciate the courtesy of notification of any use or reproduction of this paper.

only two thirds of the transaction, however. The other (and most important) third is knowing where the information can be obtained. The location of information is one of the key offerings of "universal" information brokers. It is the meat of the service that our clients buy.

Document delivery services became commercially viable in the early 1970's. Since then, and especially since the beginning of 1989, there has been an eightfold increase in the number of such services in the U.S.[2] This astounding growth has much to do with the increased demand for document delivery; but it also has to do with the fact that private sector document delivery services have kept pace with evolving technologies and have actively (sometimes aggressively) sought ways to put those new technologies to work for them in order to streamline operations or provide additional services to their clients.

The Impact of New Technologies at IOD

Virtually all aspects of the ways in which we provide document delivery service today have been substantially altered by technological advances in the last ten years. From hand-written, mailed-in request forms to fully automated online ordering by clients, from standard photocopies sent via courier to facsimile[3] or even modem-to-modem transmission of full-text documents; document delivery as we have known it has changed, and will continue to change into the next century.

Online Ordering and Tracking

IOD has had its own online ordering system, IOD DIRECT, since 1985. Actually, IOD DIRECT is only a portion of a totally integrated system which supports all of our business operations. Custom programs, supported in a Wang main frame computer, handle all of our basic routines--electronic input of orders via Telenet, routing of orders to our far-flung "runners" at sixteen locations around the country and to myriad "non-staffed" locations, generating billing and accounting information, producing on-demand status reports at any hour of the day or night, and compiling vital copyright information.

At the same time, we programmed IOD DIRECT so that it would interface with other online ordering systems; downloading orders from Dialorder, for instance, so that they would become part of our system in a seamless fashion, with sequential order number, client name and address, etc. All information is captured electronically and formatted on our own order form without additional keyboarding or processing.

For a document delivery service that receives hundreds of orders per day and provides

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[2] The commercial document delivery business began in the early 1970s to meet the growing need for documents which could not be obtained by traditional means such as interlibrary loan. Suppliers can be grouped into four general categories.: (1) libraries which provide document delivery services for users beyond the library's basic community; (2) non-profit organizations, such as societies and associations, which provide services from their collections for non-members; (3) database producers who maintain a collection of the material they abstract and index; and (4) commercial concerns in the private sector with document delivery as a business line. The fourth edition of *Document Retrieval Sources and Services* lists 271 organizations providing services within these groupings.

[3] The terms 'facsimile," "telefacsimile," or "telefacsimile transmission" will hereinafter be cited as "fax."

material from thousands of locations around the world, it only seems logical that automating these functions, and providing this level of assurance on tracking of orders as well as on royalty information capture and calculation are essential for keeping IOD at the cutting edge of information brokering.

Ordering Gateways

In addition to IOD DIRECT, IOD is a participant in many established and new document ordering systems. One example of a new project is the U.S. Department of Defense Gateway Information System (DGIS), set up by The Defense Technical Information Center, (DTIC). The system provides users with access to internal defense databases and commercial database systems including ORBIT, Bibliographic Retrieval Service (BRS) and DIALOG Information Services, Inc. IOD was selected as the document delivery supplier through DGIS primarily because of the existence of IOD DIRECT. Customized ordering software was developed by DTIC to interface with IOD DIRECT.

Another new service which IOD will be unveiling this month is IOD Biomedical Specialist. This service is an outgrowth of a captive paper collections of more than two thousand biomedical titles from which we will be able to fill orders directly, at a flat rate plus copyright royalties. Ordering by end-users, primarily health care professionals, will be through the menu-driven BRS/Colleague search systems.

It should be noted here that document ordering through commercial gateways, or from collections that are resident on Compact Disk-Read only Memory (CD-ROM) or on an online database, generally leads to a flat-fee pricing structure for document delivery. In the case of a gateway ordering system, the online vendors want to charge for the service by credit card at the time the service is rendered. This means that conventional billing is unnecessary and all parties receive their monies at the time the transaction occurs. For document ordering from a captive collection, flat-fee pricing is the norm because, by definition, the document supplier knows where to get the material. Generally there is an agreement in place under which publishers have given permission to copy at a flat copyright fee.

Transmission Rate of Orders and Documents via Fax

At IOD we have had a full-fledged fax capability for more than four years. Over that time, we have seen a great increase in the use of fax both for the receipt of orders and for the ultimate delivery of copies of the articles themselves. As a tool for communication (especially across time zones), I have long been a proponent of using fax, in fact, I have a fax machine at home so that I can do business with England or the Far East at any hour. It is obvious that fax is an important, simple, yet inexpensive building block for a document delivery service. It does not require the development time or costs associated with, for instance, an automated document ordering system. With good quality Group III machines costing about $1,000 and transmission costs at 40 cents a page domestically, it is a technology which can and should be put to use by all document suppliers. On the order placement side, we find that many clients like the convenience of sending orders via fax to us, especially if they have an internal request form which their patrons use, or if someone has given them a long bibliography with everything marked for full-text retrieval. By using fax, they don't have to re-key the information into IOD DIRECT, (we do it for them after the fax arrives at our office) and they don't have to take the time to telephone us during normal business hours.

It is interesting to note that many of the fax orders we receive are copies of downloaded searches. We assume that this is because of the widespread practice of using a search intermediary, who downloads the results and then presents a paper copy of the material to the end-user for full-text document selection. As the use of personal computer (PC) fax boards increases, we can envision that the end-users will scan the search results at their own terminal, edit the bibliography down to those documents to be retrieved full-text, and then fax the final selections directly to us from their PC.

You would perhaps be surprised at the number of people who prefer to give us a written request, rather than reading the items to us over the telephone, but when you consider the time it takes to convey a full citation for a technical article that is often in an unfamiliar foreign language, it is not surprising that a list sent by fax is vastly more efficient.

However, we continue to look for ways to make such public-private sector ventures succeed. Based on our experience to date at IOD, fax could well become a dominant means for the supply of documents within the next few years. Industry experts estimate that by 1990 there will be more than 1.4 million fax machines in operation in the U.S. alone. Increased copy and transmission quality as well as decreased basic equipment and maintenance costs should continue to make fax the delivery method of choice whenever time is of the essence. Technological developments such as enhanced digital storage (whereby as many as six hundred pages of text can be stored for later transmission), plain paper output, and wide band telecommunications networks (which will allow the faster Group IV transmission standard to develop) should all contribute to this phenomenon.

Electronic Publishing and Modem-to-Modem Transmission of Orders and Documents

The vast increase over the last few years in the amount of material which is available online in full-text format is well known to all of us. The number of journals which are published simultaneously in print and online formats is growing daily.

This trend is, in fact, not seen by publishers as such a threat to their subscription base as it once was. With the evolution of various creative royalty arrangements between publishers and database producers, publishers are rapidly seeing the merit of mounting their recently published material on full-text databases, such as the Comprehensive Core Medical Library on the BRS Search Service, and thereby assuring themselves of the royalties to which they are entitled, rather than relying on piecemeal copyright enforcement after photocopying. One present technological problem with this information delivery mode is, of course, graphics. However, for clients who must have the information right away, it is often an attractive option to have an instant computer printout of the text, followed the next day by a photocopied version of the article complete with graphics.

At IOD, we occasionally get requests for documents to be delivered to the requestor's electronic mailbox on a commercial system, or direct to their own modem. For sending long documents or for sending documents long distances (or a combination of both), we find that modem-to-modem transmission of down-loaded documents is greatly simplified by using the ARC software to "shrink" the document. Our associated company, Research on Demand, has been experimenting with this software for the last few months and they find that it makes document transmission fast, relatively easy and far less prone to errors than regular telecommunication, especially for long documents.

In the brave new world of the next century, modem-to-modem transmission of documents and the use of PC fax boards will contribute to growth in the type of document delivery service which comprised of one person working at a PC, accessing vast amounts of full-text material, and electronically transmitting it to the requestor.

CD-ROM Document Delivery Collections

An information storage and delivery medium which is gaining in practicality and popularity is CD-ROM. I would especially like to bring you up to date on the ADONIS project, in which IOD is an active participant.

I know that this Committee [NAC] has reviewed the ADONIS project in the past, but recent developments have been particularly interesting and bear a closer look. A quick review of the project's mission and history follows.

ADONIS, formally conceived in 1980, is a trial document delivery service which supplies full-text, laser-printed copies of articles appearing in 219 current biomedical journals which are stored on CD-ROM. The impact of the project was spurred by a study undertaken by Elsevier Scientific Publishing Company and the then British Library Lending Division (BLLD), which showed that the most frequently requested articles were from the biomedical disciplines and were less than three-and-a-half years old.

During the period of 1980 to 1983, various technical and financial consultants determined that, although technologically possible, electronic storage was not an economically viable alternative to the traditional labor-intensive methods of document delivery.

By 1985 advances led to the development of CD-ROM and less expensive laser printers. CD-ROM proved to be a much more compact, cost-effective storage medium that than the earlier twelve-inch disks.

In 1986 the publishers who were participating in ADONIS agreed to begin a trial project which they hoped, would demonstrate that new information technology could create a document delivery system that would be so much more effective than existing photocopying practices, that a margin could be created as a copyright revenue. It was also strongly felt that if this were the case, such technology should be used as part of the publishing process and be controlled by publishers.

Beginning with the first issues in 1987, the contents of 219 ADONIS journals were indexed and scanned on a weekly basis. Both text and graphics could be accommodated by the use of two different scanning modes - threshold and dither. Indexing was done by Excerpta Medica in Amsterdam. Once the scanning was complete, master disks were produced by Philips and Du Pont Optical in Hannover, West Germany, and copy disks were sent to the thirteen participating document supply centers around the world. In the U.S., the two supply centers are UMI[4] and IOD. Copies of individual articles produced on demand off the ADONIS system, allowed copyright royalties to be automatically recorded and calculated by the work station itself (the first part of this experiment has now been concluded).

The IOD experience with ADONIS to date has been - what one might expect with a trial

[4] University Microfilm International changed its name to UMI, Inc.

project - one of great excitement and interest generated by being involved in an experiment which surely will have a far reaching impact on the world's access to information, and yet delays, malfunctions, and frustration were what we had to contend with for the duration of the experiment. We were definitely hampered by a very serious lack of hardware support in this country (an experience which centers in other countries did not share). To the point where our system has been literally down for months at a time with malfunctioning hardware and no one assigned to come and fix it. Some initial conclusions drawn by the ADONIS participants as a whole included.

- o twenty-five percent of all articles on the system were copied at least once;
- o the quality of the printed articles was generally acceptable; and
- o comparison between using Adonis disks and photocopies showed time savings in nine of the thirteen centers. The average conventional photocopying time ranged from three to forty-six minutes per request, against the average Adonis retrieval/printing times range from one-and-a half to twenty-two minutes.

Search time was considered to be too slow, although subsequent software enhancements have improved this situation.

One of the ADONIS conclusions was that UMI and IOD were not the right choices for document Adonis supply centers. I do not believe this to be true in either case. Our hardware problems were the major reason why we documented such low usage. IOD, as a universal document delivery supplier and now as the document supplier on the BRS Colleague system, is better suited than ever to continue to be an ADONIS center.

For ADONIS to be a viable replacement for photocopying, it will need to have much broader coverage in terms of the journals included in the system. It will need to cover the top journals in any given field. Not having *JAMA* or the *New England Journal of Medicine* has been a major handicap to the success of the first ADONIS biomedical project.

As CD-ROM continues to grow as a format for document delivery, I still strongly believe that the ADONIS project should be considered as the prime example to follow and/or learn from. Its strengths are:

- o agreement by multiple publishers,
- o actively sought material,
- o accurate access points to individual articles,
- o currency,
- o rapid retrieval,
- o low copy costs,
- o excellent copy quality, and
- o copyright fees automatically captured and calculated.

The next step for the ADONIS program is to expand into pharmaceutical literature, in addition to its present biomedical collection. Present thinking is that in order to protect the publishers' printed journal revenue, disks will only be offered to those companies which already subscribe to, say, seventy-five percent of the journals. The price per copy produced would depend on whether the

hard copy is subscribed to or not. IOD hopes to be able to continue its involvement, but hopes most importantly of all that: (a) hardware and software support will be fully functional; and (b) the top journals in the pharmaceutical field will be included in the system. Without the fulfillment of these two points the vision of ADONIS as a timely viable commercial venture will never be realized.

Another CD-ROM-based document supply project in which IOD is involved in CISHealth, a Rockefeller Foundation-funded project intended to supply medical and public health information to developing countries. Components of the system will include a core database on CD-ROM for low-cost searching, dial-up access to interactive databases, and the ability to request articles from IOD via IOD DIRECT. This project should be starting up next year.

Although specific predictions about the future growth of systems such as ADONIS and CISHealth are difficult to formulate at this point, there are strong indications that CD-ROM publishing will have an enormous impact on publishing at large, libraries, and document supply services alike. As the spread of personal work stations and the development of computer networks continues, optical/digital technology will gain importance because it can provide convenient storage, accessibility and good reproductive quality. Theoretically, CD-ROM could remove altogether the need for print-on-paper journals, although I must give my personal opinion as someone who has been very close to journal publishing all my life, that this is not likely to occur in the foreseeable future. Perhaps most of all because one cannot take this system to read in bed.

Access to Library Holdings Information via Computer

In spite of the rapid developments in the above-mentioned document collections which are "captive" on full-text databases or CD-ROM, private sector document suppliers will continue to rely on libraries as the source for most of the documents they provide to their clients. As I mentioned earlier, our ability to locate materials rapidly is a large part of the service which we offer. To do so, we use many standard locational tools such as union lists on microfilm or in print, but we also tap into many online sources, both external and internal.

External systems which are used most frequently include The Research Libraries Group's Research Libraries Information Network (RLIN), MELVYL[5] and GLADIS[6]. Because our roots were originally in California, we have traditionally relied on these systems to locate needed materials. We are continually seeking new sources of electronic information on holdings, however, and would like to have access to any additional systems that will help us locate rapidly more of the world's information for our clients.

Internally, over the past four years, we have been developing our own database of information on hard-to-locate publications. With this system, we can ensure that we will not be duplicating previous efforts to find material. We also use the system as an additional check against copying material without the proper permissions, as well as for organizing the voluminous special instructions we have for doing business with thousands of publishers, libraries, document suppliers and special collections around the world. Of course, the system is easily updated as new

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[5] MELVYL, a registered trademark of The Regents of the University of California, is an online union catalog covering all nine University of California campuses.

[6] GLADIS is the online catalog of campus-wide collections at the University at Berkeley.

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information is gained on a specific title.

Predictions for the Future of Document Supply

Industry Structure

The ongoing need to supply clients with access to information located world-wide will grow well beyond the scope it has attained today. Because the literature we are asked to obtain is often elusive or needed very quickly, commercial document delivery services will continue to hold a valuable place in the "information chain".

Our relationship with the traditional library community has sometimes been adversarial in the past. But with the information explosion, the efforts of both the private and public sectors of the information community to serve the expanding information needs of their clients will be made easier through increased cooperation. I co-authored an article on this subject. It originally appeared in *Reference Librarian*, in an issue devoted to "Information Brokers and Reference Services".[7] I think it adequately presents the information broker's views on the interface between the two information sectors and discusses some of the historical stumbling blocks to full cooperation between them.

Technological Advances

In the future, there will certainly be far less photocopying and mailing of individual articles to clients than has occurred in the past. Most recently published material will be retrieved from a CD-ROM or online system and will be transmitted directly to the client via electronic means. Document requests will be received electronically or by fax and will be automatically "routed" to the most reasonable source for fulfillment, based on electronically stored holdings or availability information. Flat-fee pricing, including automatically captured copyright fees, will be the norm.

Many major libraries will be forced even more than they are now, from lack of space, to finally move large parts of their older holdings to off site storage areas. They will need to develop a document delivery service to answer their client's needs for their more dated material. I believe that for many libraries it may in the end prove more cost-effective for them to contract with a commercial document delivery supplier then to actually perform a full document delivery service themselves.

I would like to think that public and private sector document suppliers, libraries and information centers will increasingly contribute their holdings to cooperative document supply ventures of all kinds. As an information resource of the first magnitude, the Federal libraries need to re-assess current restrictions imposed on their use. In principle, INFORMATION ON DEMAND is prepared and would like to enter into a joint venture which, for instance, could better disseminate the information held in Federal libraries, while providing more rapid delivery and assuring copyright compliance at a level that is often not attained in the public sector.

Additionally, the sometimes overwhelming increase in the use of new technologies for information dissemination makes such partnerships even more reasonable and valid. Because the private sector can generally rationalize better service resulting from the incorporation of new

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[7] Maxwell, Christine Y., (Information On Demand, Inc., Berkeley, CA) and Reinheimer, Ellen C., "Librarian and Information Broker: The Challenge of Cooperation"; Reference Librarian, Issue 22, p. 105-112, 1988,5.

technologies by simply raising its prices, it is in a better position to pilot such projects than the public sector.

As I stated earlier, IOD looks forward to increased cooperation between both sectors. At the least, the very fact that I was invited there today bodes well for increased discussion and information exchange between the public and private sectors. At best, it will lead to active partnerships in the provision of information between many of the organizations represented here today.

UMI/IEEE PRODUCTS

Pauline Angione Zoellick[1]

Introduction

My remarks today will deal with the use of current and future electronic systems to provide document delivery. Specifically, my focus will be on the trends and technology driving activities in this arena, the current reasons for distributed and network versions of products, the markets, the issue of rights, and a brief look at systems of the future.

Trends

The reason for document delivery, electronic or otherwise, is the user's need for information. Developments in computer handling and delivery of bibliographic information over the last twenty years have vastly improved our ability to access citations and to identify relevant ones from vast databases. The development of online and on-disk bibliographic tools is putting the ability to search into the hands of many. This resulted quite naturally in increased demand for the object of those searches, the original documents.

As users become used to the ease, speed, and power of automated access to bibliographic information, their expectations for similar systems for document delivery grow.

Technologies: Formats and Delivery Systems

Today's technologies continue to provide better, more cost effective tools with which to distribute documents. Thus, the options open to product developers continue to grow. Different technologies lend themselves to different types of documents, and market factors influence that choice as well.

Before we continue I would like to present some distinctions in the terms used to describe various full-text electronic delivery options.

Two key aspects to clarify and keep in context are the format in which the document is actually presented to the user (as opposed to its "original" form) and the type of delivery system being used.

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[1] Pauline Angione Zoellick is an independent consultant and gave the following paper under her former name, Pauline Smillie. This paper is based on her presentation given on November 30, 1989, at the Library of Congress Network Advisory Committee meeting in Washington, DC. The opinions expressed herein are the author's. The author would appreciate the courtesy of notification of any use or reproduction of this paper.

1. Formats

The three most common format choices are (1) machine readable format, (2) image format, and (3) a hybrid of the two.

In machine readable format, the material has been keyed or OCR'd (via Optical Character Recognition) to produce an American Standard Code for Information Interchange (ASCII) file. This file can then be searched, edited, and/or downloaded easily. It does, however, often bear little resemblance to the original printed page. Most or all graphic content is lost, original pagination is no longer relevant, etc.

In image format the material is scanned and the user is presented with a reproduction of the original page with illustrations, charts, fonts, pagination, etc. in their original form. The text in this case is not searchable, and cannot be edited. The files can be downloaded, but are large and require compression/decompression software in order to be viewed or printed.

Hybrid systems contain ASCII cataloging or index and abstract records and/or ASCII text "linked" or matched to imaged full pages or portions of pages, such as graphics, or non-Roman alphabets. This combines the benefits of both formats in terms of searching and in maintaining the original page layout. Hybrid systems do, however, require more storage space and more complex interface software.

2. Delivery Systems

Two types of delivery systems will be discussed in this paper: distributed and networked.

In a distributed system products are designed to be produced in discrete "packets" and delivered or "distributed" to customers for use at local, stand alone, intelligent work stations--often IBM Personal Computer AT class micro computers. Such systems today are generally Computer Disk-Read only Memory (CD-ROM) based and contain ASCII and/or image data. They can be purchased or licensed for a fixed yearly fee. Usage is unlimited within the customer site or community. There may or may not be charges for printing depending on the regulations of the primary and/or secondary producers. These charges can be absorbed by the host institution if they so select. More on this later.

Some distributed products are finding their way into small local area networks (LAN's) where the purpose of the LAN is to minimize disk handling and provide security. This configuration also allows a single work station to be available for use with different products. But in essence the product is still a distributed one.

In general, distributed systems have a distinct user base defined by the constituency of the customer and are delivered to and used at a single site. They may in addition make limited use of local area network technology.

In contrast to this is the truly networked or online system. Products are designed to reside on a large mini or mainframe machine. They rely heavily on telecommunication access via terminals (or microcomputers emulating terminals) to a large central processing and storage facility.

Such systems currently tend to store source data in magnetic form, and are accessed on a time sharing basis. They typically involve open-ended connect charges as well as print and sometimes display charges per record or page.

Just as there is often no single best way to format a product, there is rarely one best way to deliver it. Such decisions are based on many factors, including (1) the original form of the document (if ASCII text is available, in a usable format, from a production process); (2) frequency of update, ways in which the data is to be used (including frequency of access, type of access including quick reference, browsing, and reading); (3) the availability of related access tools (are index or cataloging records available for searching so that pages can be stored as non searchable images); (4) the importance of the graphic components to the user or in the text (does the publication rely heavily on charts, graphs and page layout to present and explain information); (5) available storage space at both production and user sites; (6) installed base of equipment in the target markets; and (7) the market's ability to upgrade equipment within time frames acceptable to sales targets.

In general ASCII data works well in either distributed or networked delivery environments, as relatively small amounts of ASCII data are being distributed or transmitted.

Image data, on the other hand, currently functions poorly in online or truly networked environments for several reasons. A compressed image of a journal page can easily require 100K (one hundred thousand bytes) of storage space, and a typical article contains five to ten pages. Even sophisticated networked systems available today can easily be taxed by trying to store, queue, and transmit such large files. Future systems with hundreds of gigabytes of magnetic storage and fibre optic links offer great promise for all types of document delivery. Although some major size institutions are planning for such systems they are, in fact, rare today, and will continue to be so as the market for electronic products grows.

Markets

Let us now take a look at some of the current and potential markets for electronic document delivery. Key questions are those of expenditures, price, ability to pay, ability to charge, and relative or net savings.

Expenditures include not only the cost of the information product, but also an investment in systems to support electronic delivery as well. Distributed systems generally require an AT class micro computer, an EGA (with extended graphics adapters) monitor, a laser printer and a CD-ROM player in order to function effectively. While many libraries have such equipment for administrative and staff use, purchase of document delivery products requires that duplicate systems be acquired for use in the reference area. Networked systems require major investments and careful strategic planning.

As the installed base of suitable equipment grows distributed document delivery products will have broader appeal. In the interim publishers and product producers are faced with the need to serve one market and exclude the other, generate compromise systems that can make the transition from distribution to network, or wait and take the risk of being preempted by competitive forces.

Both primary and secondary publishers want royalties to be high until they determine the impact of electronic services on their base businesses. Vendors are attempting to build businesses and markets and to recoup development costs. And, while prices remain high and product offerings limited, markets grow slowly.

Coupled with current high prices for electronic products is the problem of an institution's ability to pay for the product and charge for its use. The online environment in document delivery created changes in the way many libraries have to pay and are charging for information. So too, document products must find their way in establishing an infrastructure which will support their purchase price and service requirements. Many institutions have come to terms with patron paid charges for online searches and for photocopying, but see a distinct difference in moving to a system where access to primary journals requires a patron fee. While the systems themselves offer revenue opportunities, through such mechanisms as print charges, some institutions are opposed to charging and some simply lack a cost effective mechanism by which to collect and redistribute funds.

At the other extreme there are instances where funding is available for materials in machine readable form but is neither available for print items nor for additional library space to house print or microfilm. It has increasingly been my experience to discover funding agencies, both domestic and international, who are insisting that their monies be only used for electronic solutions to information problems.

Accurate economic models of the real costs of running a library are lacking in many cases. Product and equipment costs are only part of the picture. Many other factors must be taken into account in evaluating the cost of new products. Electronic technologies offer opportunities for savings via reduced professional staff involvement in facilitating bibliographic and physical access, within the library and via interlibrary loan. Less clerical time is required for reshelving, servicing of photocopy machines, etc. Space savings can be very real, resulting in reduced overhead and less new construction in the long term. Binding costs can be reduced or ultimately eliminated. Collection maintenance and replacement costs can be reduced. And, electronic document delivery systems also reduce wear and tear on materials from usage which, in large part, is the result of increased demand created by electronic indexing services.

Publishers have little data on which to base site licensing agreements equitable to both producer and consumer. Indeed, one of the very real contributions that electronic document delivery systems offer is the ability to track items viewed and printed. This provides the library and the publisher with accurate data on what is actually used, valuable data on which to base future product and pricing decisions. And, it relieves the library of the burden of the tracking use.

From the user point of view, electronic systems tend to be readily accepted due in part to an increase in the number of "techno-literate" individuals in both the user and donor communities. In addition, there has been a ground swell of support from current and potential users of electronic systems. As one Australian librarian expressed it, "...there is more enthusiasm for information on CD-ROM than there ever was for materials in print."

Rights

Both primary and secondary publishers are wary of the economic impact of such systems on their print and online products. Some will not grant electronic redistribution rights. Others insist on substantial royalties, designed to protect their current investments. Both solutions, unfortunately, tend to decrease market appeal which also keeps prices high.

As mentioned earlier, the data supplied on actual system usage should serve in the long term to make the situation more equitable from both producer and consumer standpoints. In the

short term the inability to provide access to desired journals creates another force in slowing the growth of the market.

There appears to be a growing awareness amongst primary publishers that they should not go to the marketplace with their publications alone, but rather that they should do so in concert with other publishers within their markets. Such cooperative activities amongst publishers can take decades to form. Alternatives, such as turning electronic redistribution rights over to a third parties, also require long lead times and thoughtful negotiation.

Secondary publishers for the most part have had to come to grips over the past decade with the distribution of their data in machine readable and manipulable form. And, while they are concerned as the impact that distributed electronic substitutes will have on their print and online revenues, they at least have experience and revenues from one type of electronic access. This gives them firsthand knowledge of the basic technologies involved and an indication of the potential revenues that electronic access can offer.

Many primary publishers are not in this position. For them it is their first foray into electronic distribution. They have little data, internally or from the market place, on which to base their decisions. In some cases even a basic understanding of the technology is not present. Among some publishers there is a guarded interest in pursuing the image format option as a "safe" way to get an indication of the market for, as well as an understanding of the after market usage of, their data in electronic form.

One thing is clear. Publishers are increasingly aware that decisions have to be made. They realize that ignoring the situation will not make it go away. They have learned an important lesson from photocopying and are anxious to find a way to protect their investments in and their rights to the materials they publish.

Future

What does all this mean in terms of the real opportunities for electronic document delivery? From my perspective it means a diversity in the types of services offered, and the coexistence of various forms of document delivery, both short and long term.

There are good reasons to have materials available in print as soon as they arrive in a library for unlimited browsing by patrons. Similarly, there are increasing opportunities for such materials to be broadcast in electronic form to individual work stations.

Only certain materials are used heavily enough to warrant the costs of converting them to electronic form. There are scores of documents that need compact, archival storage without heavy use that are still ideal candidates for microfilming. There are certainly instances where the preservation of the artifact is still essential for scholarly research. And, this is true even if the original is also filmed, scanned, or keyed into electronic form to make its contents available to a wider range of scholars within the intellectual community.

In addition, the market will remain varied in its ability to absorb the newer technologies. Despite the success of online services, we all still know of places that would benefit from access but do not have it. We all know places that are restricting their investment in distributed systems (sometimes over the protests of users) in order to support the building of future networked

solutions.

And, although the mix of technologies available to us is much richer than it was only five years ago, there are still functionalities (color, cost effective updating techniques, printer speeds, system reliability and standardization, etc.) that we as developers are want. These include tools that we are waiting for with which we can provide richer, better presented, more reliable, and more easily accessed products.

In sum, there are many options available, and there is a rich and complex set of factors influencing choices among them. The coming decade should bring answers to many of our current questions, just as I am certain that the decade will provide electronic delivery options in a variety of forms to an ever increasing number of users.

IMAGE TRANSMISSION OVER INTERNET:
The NAL Experience

Gary K. McCone[1]

NATDP - Background and Early Phases

The National Agricultural Library (NAL) and forty-four land-grant universities have been working for the past two years on a cooperative project, called National Agricultural Text Digitized Project (NATDP), to test a new method of capturing full-text and images in digital form for publication on Compact Disk-Read only Memory (CD-ROM). (See attachment 1, NATDP, page 73.)

Phase one involved testing the scanning/OCR (optical character recognition) workstation and evaluating several software retrieval packages, as well as eliciting reactions from both land grant librarians and end users.

The first CD-ROM disk contains four thousand pages of aquaculture material, and uses Textware software. The second disk contains documents published by the Consultative Group for International Agricultural Research (CGIAR), using KAware2 software. The third disk, which uses Personal Librarian software for access, includes NAL's extensive documents collection on the herbicide Agent Orange. Each CD-ROM includes both bit-mapped page images and corresponding American Standard Code for Information Interchange (ASCII) files which allow for full-text retrieval.

Phase two is being accomplished under a Department of Education Title IIC grant at the University of Vermont where approximately one thousand Canadian government documents pertaining to Acid Rain are being scanned, digitized, and cataloged. The resulting eleven thousand pages will be published on three CD-ROMs and distributed to the participating land grant libraries in March 1990.

Phase Three - Image Transmission Overview

Phase three, the transmission of digitized page images to remote sites, is the direct result

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[1] Gary K. McCone is the head of the database administration branch at the National Agricultural Library in Beltsville, MD. This paper is based on a presentation given on November 30, 1989, at the Library of Congress Network Advisory Committee meeting in Washington, DC. The opinions expressed herein are the author's and do not necessarily reflect those of the National Agricultural Library. The author would appreciate the courtesy of notification of any use or reproduction of this paper.

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of a study prepared for NAL by Clifford Lynch, the director of the Division of Library Automation at the University of California, Berkeley. This cooperative project, conducted by NAL and the North Carolina State University (NCSU) Libraries, established four objectives and attempts to evaluate the following elements of each objective: (1) the use of standard image formats, widely-supported, for scanned page images; (2) the use of display computers, widely available, for manipulation of page images; (3) the efficiency, speed, and ease-of-use of the national Internet and Local Area Networks (LAN) for distribution of page images; and (4) the administrative structure and procedures required for solicitation and attainment of requests them through electronic distribution.

Image Formats

The project will be using Tagged Image File Format (TIFF) as the data exchange standard for digitized page images. The scanning workstation at NAL creates image files in the high resolution LaserView format which must then be converted to TIFF by software algorithms.

End User Computers

In order to display the LaserView page images, users in the first two phases of NATDP must have a special high-resolution monitor. This project will investigate techniques that will enable a user to obtain the best possible image on whatever retrieval station is being used. Most of the nodes used initially at NCSU will be Macintosh IIs.

Internet and LANs

The National Science Foundation's (NSF) Internet currently connects more than forty of the land grant universities which closely cooperate with NAL, although not all of their libraries are connected, yet. NCSU will utilize the Ethernet capabilities in its computer center and the AppleTalk-based LAN in the D.H. Hill Library at NCSU to retrieve image files from Internet and redistribute them to users. (See attachment 2, NSF-Sponsored Internet Protocol Networks, page 74.)

Administrative Procedures

Project staff at NCSU and NAL will develop and evaluate several mechanisms for processing document requests, both for this limited study and also should image transmission be adopted for Interlibrary Loan (ILL) production in the future.

Image Delivery to End User

After the page images are received and acknowledged by NCSU library staff, they must be distributed to the requestor. Three distribution methods will be evaluated.

- o Direct electronic delivery: the requestor will pick up an electronic copy of the images directly from the NCSU VAX computer, once notified by library staff of the file location.
- o Intermediate electronic delivery: the requestor will review images on one of the NCSU library nodes. If electronic format is required, library staff will provide copies of images on diskette.
- o Print copy delivery: NCSU library staff will review images and print copies at 300 dpi (dots per inch) for delivery to requestor.

Operating Environment

NAL has installed several pieces of equipment to access SURAnet, one of the thirteen regional Internet protocol networks. Because NCSU is already connected to SURAnet, and has an operating AppleTalk LAN, they only needed to connect the D.H. Hill Library with the Computing Center. (See attachment 3, Equipment Installed at NAL, page 75.)

For this pilot project, NCSU library staff will utilize several mechanisms for locating and processing document requests that can be satisfied by the project technology. (See attachment 4 Electronic Distribution of Digitized Page Images Logical Network Schematic, page 76.)

Sources of Citations

To insure that requested documents are located at NAL, three sources will be preferred:

- Aquaculture CD-ROM
  [NAL will have digitized images already]
- AGRICOLA online or CD-ROM
  [or *Bibliography of Agriculture*]
- OCLC records with NAL as a location

Sources for Requests

Most requests will originate at the D.H. Hill Library, or be channeled through there at least initially. The agricultural research area, the Vet Med Library, and other locations may also generate requests.

To avoid having to deal with the "C" word, only documents produced by the government or other copyright-free publications will be requested and delivered. While there are certainly enough such publications to satisfy this pilot project, the copyright issue has to be addressed before any large-scale implementation of an image transmission system could be considered.

Delivery of Requests

Requests will be sent to NAL by Email via Internet, Bitnet, ALAnet, etc. The project will also investigate using the OCLC ILL system and telefacsimile[2] to request documents.

Filling of Requests at NAL

NAL lending staff will divide the requests into "Special Handling" and "Normal Workflow," to assess impact on lending and contractor workflow. Special handling requests will be sent by fax and received throughout the day. Normal workflow requests will be sent by Email and received by NAL once each day.

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[2] The term "telefacsimile" will also be cited as "fax."

Evaluation

The evaluation will address four broad areas: ease of use and accessibility to the end user, demand, cost-effectiveness, and copyright issues. If the system proves to be "user-friendly," the demand sufficient, the means of document delivery cost-competitive, and copyright issues resolvable, then further progress along the lines of this project would clearly be warranted.

Future Directions

As NAL continues to create full-text CD-ROMs and explores image transmission, the number of documents available in digitized format will continue to increase. Because AGRICOLA is the primary access tool for NAL collections, we will need to develop a method of recording the existence of a digitized version in the USMARC record for a document.[3] Ultimately, the image files could be stored on a device accessible through Internet so requesting libraries could simply download the images directly and not go through NAL's Lending Branch.

Land grant university libraries may want to take an active role in building the database and scanning documents at their own locations. Participating libraries could be assigned to digitize a certain set of publications, or could scan them as they fill in-house photocopy or ILL requests. The resulting image files could be centrally located, or more likely, distributed at locations around the Internet but with a central index to them.

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[3] The Library of Congress has initiated steps to add a new data field to the USMARC formats to describe the availability of full text documents and digitized versions in machine-readable form. [Ed. note.]

National Agricultural Text Digitizing Project

Phase 1 -- Pilot Project

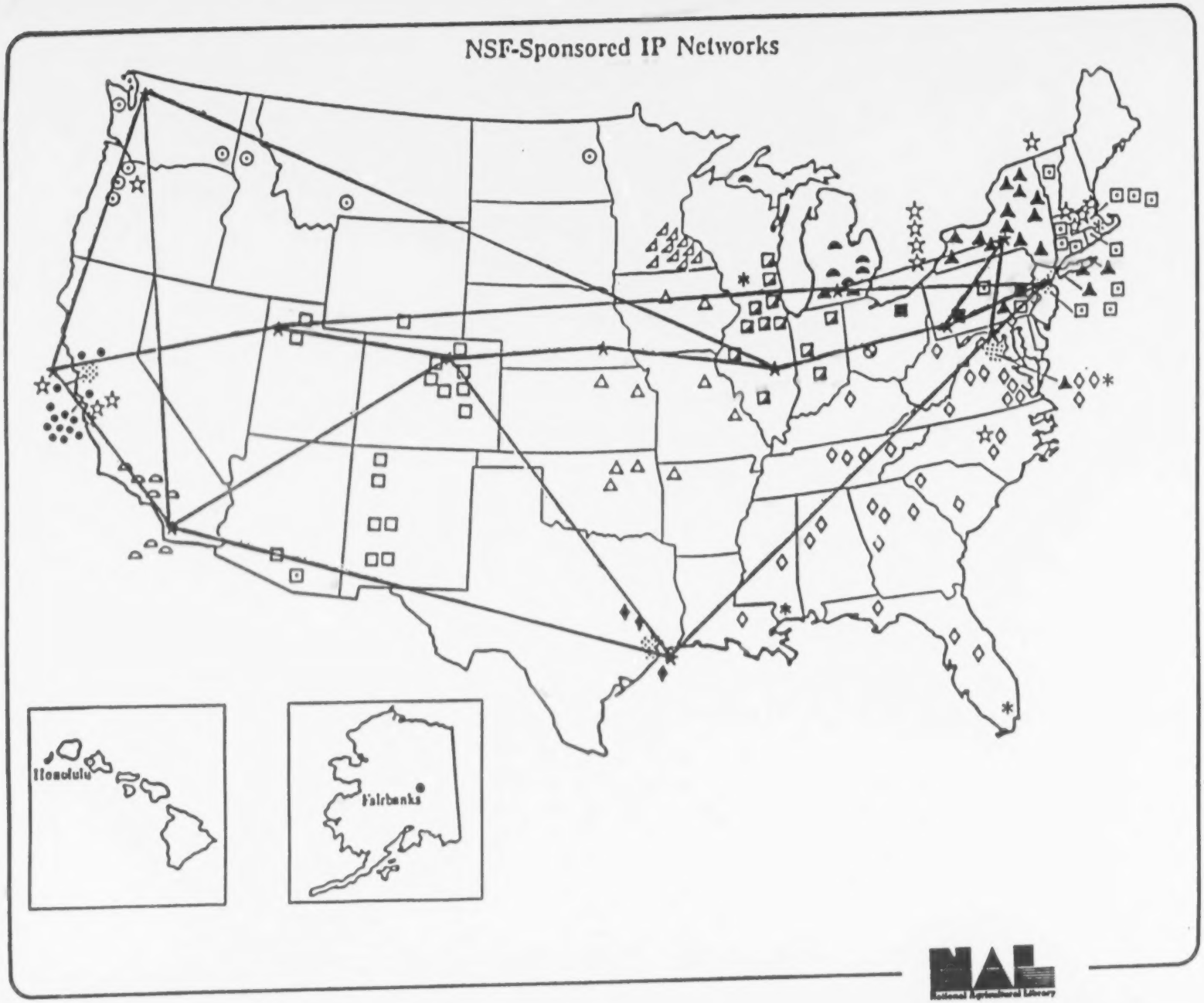
Aquaculture
CGIAR
Agent Orange

Phase 2 -- Comprehensive Product

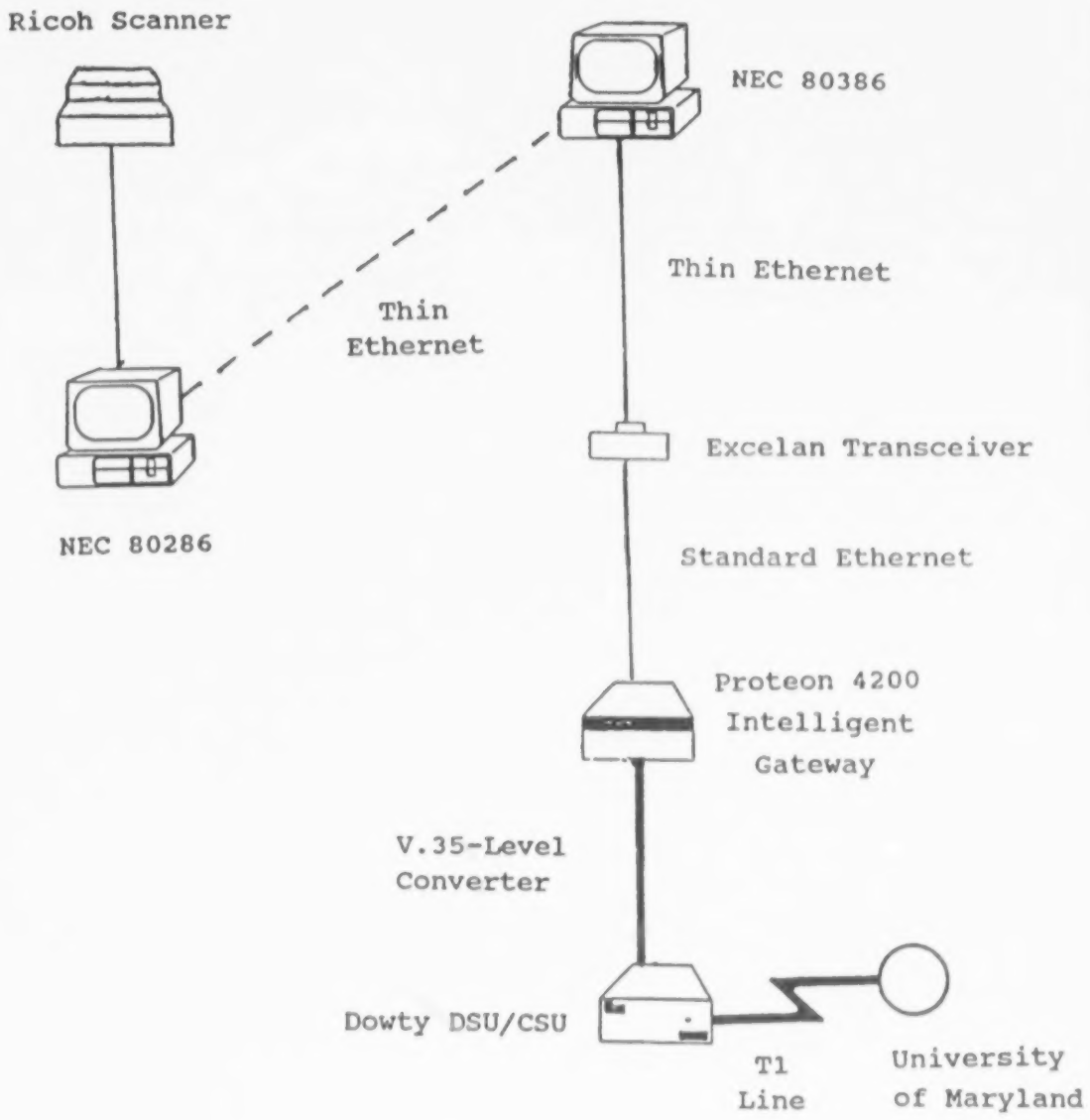
Acid Rain

Phase 3 -- Telecommunications

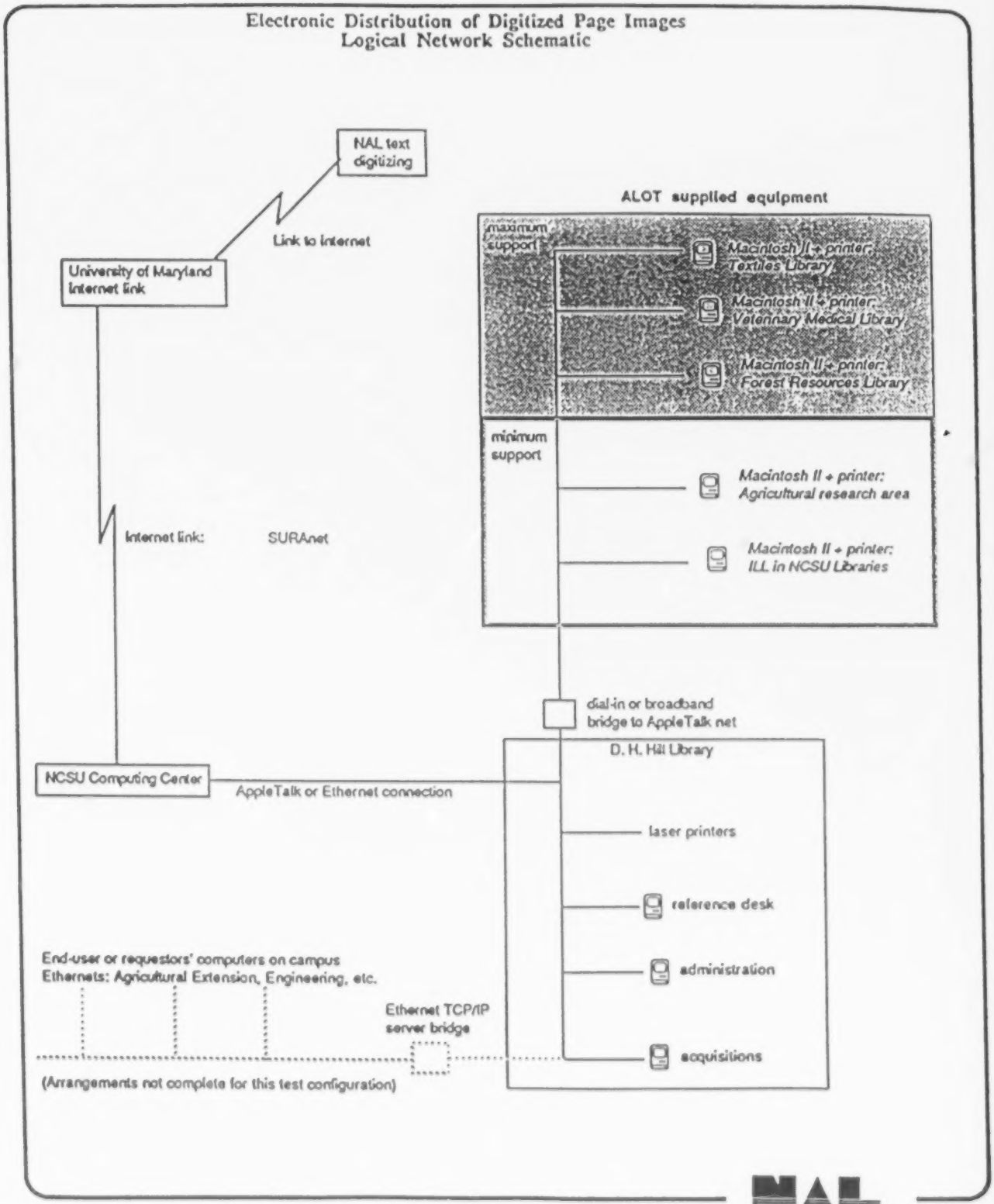
Image Transmission


NSF-Sponsored IP Networks
Honolulu
Fairbanks

Equipment Installed at NAL



ATTACHMANT 4


Electronic Distribution of Digitized Page Images
Logical Network Schematic
NAL text digitizing
Link to Internet
University of Maryland Internet link
ALOT supplied equipment
maximum support
Macintosh II + printer: Textiles Library
Macintosh II + printer: Veterinary Medical Library
Macintosh II + printer: Forest Resources Library
minimum support
Macintosh II + printer: Agricultural research area
Macintosh II + printer: ILL in NCSU Libraries
Internet link:
SURAnet
dial-in or broadband bridge to AppleTalk net
D. H. Hill Library
NCSU Computing Center
AppleTalk or Ethernet connection
laser printers
reference desk
administration
acquisitions
End-user or requestors' computers on campus
Ethernets: Agricultural Extension, Engineering, etc.
Ethernet TCP/IP server bridge
(Arrangements not complete for this test configuration)

81

SUMMARY OF BUSINESS SESSION

The agenda of the business session at the Library of Congress Network Advisory Committee (NAC) meeting was brief and included the introduction of new NAC representatives, the Membership Subcommittee report, reports by the U.S. National Commission on Libraries and Information Science (NCLIS), the Association for Library and Information Science Education (ALISE), MINITEX, planning activities underway for a pre-conference to the second White House Conference on Libraries and Information Services (WHCLIS), and the next meeting's date and place.

New Representatives

Henriette D. Avram, chairman of NAC, opened the November 1989 meeting by welcoming all attendees and distributing a statement by the Librarian of Congress to the Subcommittee on Science, Technology, and Space (appendix B) to all attendees for their information.

Avram then extended a special welcome to a new NAC member organization--the Networking and Telecommunications Task Force of EDUCOM with Ronald Larsen, associate director for information technology at the University of Maryland, as its representative. Avram also reported on a number of changes in the NAC membership representation by greeting Bonnie Juergens, AMIGOS's executive director; Marshall Keys, NELINET's executive director; Kate Nevins, OCLC's vice president of corporate relations; and Mary B. Levering, the Federal Libraries and Information Center Committee's acting executive director on behalf of the Network Advisory Committee. Eleanor Sacks, research associate at the Council of Library Resources attended for Jim Haas. Finally, Ronald F. Miller as the new executive director of the Western Library Network has (WLN) will no longer represent the Cooperative Library Agency for Systems and Services (CLASS).

Membership Subcommittee Report

Lois Ann Colaianni, associate director of library operations at the National Library of Medicine and chair of the membership subcommittee, reported on a decision regarding the status of two organizations in NAC: the Council on Library Resources and NCLIS. Both were declared ex officio members and as such are not required to attend but have the right to vote on all issues. This decision allows for two more members before the limit of thirty-five will be reached. She also made available the November 1989 revision of the NAC criteria (see appendix C).

Applications for membership in NAC were received from two organizations, the U.S. Department of Education's Office of Library Programs' and the Copyright Clearance Center, Inc. (CCC). The NAC membership approved the application of the U.S. Department of Education for an ex officio membership following the subcommittee's recommendation and will be represented by Neal K. Kaske, senior associate in the Office of Library Programs. The application from CCC was not approved since CCC is not the type of organization generally accepted for membership on NAC. CCC is not directly engaged in regional or nationwide networking and does not have a significant impact on the development of networks. However, the NAC representative of the Association of American Publishers will be asked to notify the chair of NAC in the future of any

meetings to which CCC should be invited as an observer.

Report from NCLIS

Susan K. Martin, executive director of NCLIS, reported on NCLIS work with regard to action agenda item nineteen to "collect existing inventories of electronic archives and identify gaps in electronic data access, control, and preservation...." Martin stated that until after WHCLIS II [to be held on July 13-18, 1991, in Washington, DC.] NCLIS will have no staff available to do any research into the universe of electronic archives. She feels that the quest should then be blocked out into manageable components to be studied. Martin also distributed a report by NCLIS on its activities during April to November of 1989. (See appendix E.)

Report from ALISE

Toni Carbo Bearman, dean of the school of library and information science, University of Pittsburgh, gave a progress report on action agenda item eighteen to "investigate how library education curricula address the issues, concepts, and current status of networking." Anne Woodsworth, also at the University of Pittsburgh's School of Library and Information Science , had prepared a study titled "Current Status of Library Education for Networking." The study, still in draft form, will be reviewed by all members of ALISE and a final version can be expected by the end of 1990. Bearman, chair of the NAC Ad Hoc Education Group, plans to meet during the next American Library Association's (ALA) annual conference to discuss cooperative participation with other organizations, e.g., Association of Specialized and Cooperative Library Agencies (ASCLA), Library Administration and Management Association (LAMA), and Library and Information Technology Association (LITA). Other members of the group are Henriette D. Avram, Bonnie Juergens, Clifford Lynch, Kate Nevins, and C. James Schmidt.

Report from MINITEX

William DeJohn, director of the MINITEX Library Information Network, gave a preliminary report on his assignment to propose a better term for "non-bibliographic" databases. A literature search as well as a query of several people in the field were carried out and several terms seem to be used most often to describe non-bibliographic databases. They are data-files, data-banks, source databases, and source files. In conclusion, he asked for few volunteers among NAC members to assist him in this assignment. Toni Bearman and Mary Levering, acting executive director of the Federal Library and Information Center Committee (FLICC), volunteered.

Pre-White House Conference Planning

Mrs. Avram reported on planning activities of NAC members for a "Networks for Networkers II" pre-conference to be held sometime in 1990 in anticipation of WHCLIS II. (See appendix D for background documentation.) Barbara E. Markuson, the executive director of the Indiana Cooperative Library Services Authority (INCOLSA), chair of the 1979 pre-White House Conference and editor of *Networks for Networkers*, was asked to join the planning group. Since 1989, local NAC members Carol Henderson and Bob Oakley, augmented by EDUCOM's president Kenneth M. King and Barbara Markuson, met several times at the Library of Congress with Mrs. Avram to work on budget, topics, design, and organizational requirements needed for the pre-conference. Thanks to the original members of the planning group--Richard G. Akeroyd, William DeJohn, Frank P. Grisham, and Susan K. Martin--the planning activities received an excellent head-start.

Next Meeting and Adjournment

After a postponement, the date for the next meeting was set for early 1990. The topic of the meeting will be the slightly revised action agenda item twenty-four to "investigate state networking developments and the role of state agencies in fostering activities...." The study became more focused and will be "on the impact of local library automated systems on the development of state and national networks." Mrs. Avram appointed David H. Brunell, the executive director of the Bibliographical Center for Research, to chair the program planning committee for the next NAC meeting. Other members on the planning subcommittee are Howard R. McGinn, director of the state library in North Carolina [McGinn is the new representative of the Chief Officers of State Library Agencies (COSLA), Richard Akeroyd represented COSLA until December 1989, ed. note.] and Joseph F. Shubert. Louella V. Wetherbee, formerly representing the AMIGOS Bibliographic Council on NAC now an independent consultant, was asked by Avram to prepare the background study for the meeting.

Wetherbee conducted the second plenary session at this meeting and discussed her proposed study with NAC members. Her study will focus on the actual and potential effect of local automated library systems on the development of the national database and on resource sharing through existing interlibrary loan systems. The principal focus of the study will be on local shared automated systems that may or may not have an impact on national resource sharing data. Wetherbee plans to contact twenty-five to thirty local automated library systems and query them. Several will be selected (with the assistance of the planning subcommittee) and studied in more detail. Some will be chosen to present their organization's involvement at the next NAC meeting.

Mrs. Avram adjourned the meeting at noon on December 1, 1989, after thanking all for their active participation. She expressed special thanks to the program subcommittee chair, Charles Bourne, and the other members of the program committee for the selection of stimulating speakers addressing the intricate issues of electronic document delivery in the library networking environment.

APPENDIX A

LIBRARY OF CONGRESS NETWORK ADVISORY COMMITTEE

MEETING AGENDA
November 29-December 1, 1989

Wednesday, November 29
8:30 pm

BUSINESS SESSION
Presiding: Henriette D. Avram, Library of Congress
- o Report from the chair
- o Membership Subcommittee report
- o Report from NCLIS
- o Report from ALISE
- o Report from MINITEX
- o Pre-White House Conference Planning

Thursday, November 30
9:00 am

PROGRAM SESSION
Henriette D. Avram, chairman
Welcome and introduction to goals of meeting
Charles E. Bourne, DIALOG Information Services, Inc.
Chairman, program committee: background overview
Kate Nevins, OCLC Inc.
Extension of traditional Inter Library
Lending approach: the OCLC experience
Lois Ann Colaianni, National Library of Medicine
DOCLINE: the NLM experience
Dennis Smith and Clifford Lynch,
University of California, Inter Library Lending activities:
the UC experience
Margaret Y. Walshe, CISTI
Stored online text/image: the CISTI experience
Christine Maxwell, Information on Demand
Information broker services: the IOD experience
Pauline Smillie, consultant: UMI/IEEE products
Gary McCone, National Agricultural Library
Internet image transmission: the NAL experience
Charles Bourne, moderator, general discussion

Friday, December 1
9:00 am-12:00 noon

Dennis Smith, moderator
Plenary session - policy issues for NAC
Louella V. Wetherbee, moderator
Second plenary session - impact of local library
systems on state and national networking
(background paper for February 1991 NAC meeting)

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S. 1067 On The National Information Network
Statement of James H. Billington, The Librarian of Congress
to the Subcommittee on Science, Technology, and Space
Committee on Commerce, Science and Transportation
United States Senate, September 15, 1989

Mr. Chairman and Members of the Subcommittee:

I appreciate the opportunity to be here today with my colleague, Henriette Avram, Assistant Librarian for Processing Services, to comment on S. 1067, a bill to provide for a coordinated federal research program to ensure continued U.S. leadership in high performance computing. My comments will be limited to the role the Library of Congress and other research libraries should play in such a national computer highway.

As you know, the Library of Congress has for over twenty years made machine-readable bibliographic data on materials received in the Library of Congress available in tape mode. This data, that is of enormous benefit to the nation, saves libraries around the country some $360 million in cataloging costs annually. In the last 10 years we also have been providing online service for cooperative cataloging projects benefiting the Library of Congress and other libraries.

Our most recent project--announced just last week--is a pilot program to put online 14 libraries of different kinds throughout America -- state, public, government and university -- offering direct access to the Library of Congress' automated data on bibliographic records, status of bills in Congress, copyright, and research referral services.

With 88 million items in the Library we have the largest collection of recorded information and knowledge ever assembled in one place here on Capitol Hill. The Library of Congress represents the nation's most important single resource for the information age. The proposed establishment of a National Research and Education Network would give an immense boost to the access of this material and allow the Library of Congress to provide to the country much more of its unequalled data and resources which can now be obtained only by visiting Washington.

Already, in our modest nation-wide pilot program for online access to our data, the first question of many participants is "Can we use the existing National Science Foundation network for access to Library of Congress data?" This indicates the interest in a major national network.

It is obvious that the network envisioned in S. 1067 could be very important in making available Library of Congress resources to more scholars and researchers around the United States. The Library of Congress has important data bases that it develops as search guides to information collected from all over the world on every subject except clinical medicine and technical agriculture.

APPENDIX B

The Library's collections of foreign-language materials -- two-thirds of its collections -- are unique to this country. We have the largest collections of Slavic, Hispanic, Chinese, Japanese, and Korean materials outside of the country of origin in the world. This information is the major international resource for scientists, economists, policymakers, and other scholars in this country.

Moreover, the Library of Congress has recently acquired from the University of Chicago the National Translation Center which is an international depository and referral center for helping users locate unpublished translations of foreign-language literature in the natural, physical, medical, and social sciences. The Center's files contain information on the whereabouts of 1 million translations, of which 400,000 full text translations are held directly by the Center.

The Library's automated bibliographic files assist users in identifying the existence and location of this information which is essential to those wanting access to these rich resources.

We are working in the image data area with optical disk and video disk projects. In addition to books and periodicals, the Library's collections encompass all forms of materials--maps, charts, motion pictures, prints and photographs, and computer software, to name only a few. Once these materials are captured in electronic form, we envision a "library without walls" for those materials which are unavailable elsewhere. We believe that we can make such data increasingly accessible to users beyond the Library of Congress premises. To do so, a sound, high-capacity networking system is needed. Image data, as you know, is very high-volume data. The network proposed in S. 1067 would appear to be a natural vehicle for disseminating our electronically recorded resources.

Increasingly, data will be coming to the Library of Congress in machine-readable form or be generated at the Library in this form. Major educational institutions are also creating electronic information.

A significant asset at the Library of Congress is our graphics collections -- prints, photographs, drawings, maps, charts, and essential scientific graphs. Often the only copies in existence are at the Library of Congress. Our video disk project has successfully captured images of a portion of this material in machine-readable form, which could become a significant resource during the next several years for researchers across the country. "American Memory" is a major new Library of Congress initiative that will use optical disk and other advanced technologies to disseminate unique and variegated elements of the Library's vast collections of American history and culture throughout this country and the world. It will put Library of Congress collections in libraries and schools around the U.S.

The proposed high speed, high capacity National Research and Education Network could greatly facilitate this broadening access to all our resources.

During the last decade Mrs. Avram has represented libraries on the EDUCOM Board of Trustees to insure that any proposed national network will meet the needs of libraries as well as that of the research community. The proposed network must incorporate a consistent family of standards and techniques -- just as the Library of Congress, in cooperation with other libraries, has devised national standards for cataloging. This single network should fulfill the requirements both

of those creating and exchanging information and of those searching for the information for research purposes.

This brings me to Title III of your bill, the National Information Infrastructure: the National Science Foundation is directed to coordinate with federal agencies the development of a national science and technology information infrastructure. We believe that the Library of Congress -- as the national library and as the largest information resource in the federal establishment -- should play a prominent role in the development of such an infrastructure.

In your invitation to me to testify today, you asked that I address the issue of copyright. My colleagues in the Library's Copyright Office believe that in most instances an author whose works are available online over a network can protect himself or herself through contractual agreements with vendors and libraries and through copyright license agreements. Computers have a record-keeping and transaction tracking capability that could be used to establish and account for user fees for specific services and works. These fees could include a royalty payment for use of copyrighted material.

Currently, data base vendors enter into contract with purchasers of their services that include restrictions of access and use. Part of the fees paid by purchasers typically reflect copyright royalty payments for use of copyright materials. But abuses can occur. This issue will need much further study.

The question of fees for information on a national computer network directly relates to a subject that is discussed at length by educators and librarians but which is addressed by others only peripherally -- that is, "national information policy." As you know, congressional committees with jurisdiction over federal information and its distribution have held hearings in recent years, but no national policy has been articulated. While S. 1067 is a step forward, additional efforts must be made to develop a policy on federal information if the United States is to remain competitive.

We must recognize the rights of our citizens to obtain this information. We must also face the issue of user fees for information gathered both at the national and local levels. Some compromises will be necessary to accommodate these competing interests -- the users and the creators -- if we are to avoid becoming a nation of information haves and have-nots. Information must not be too expensive, and it must be widely shared if the full creative talents of the country are to keep us creatively alive and internationally competitive. Yet to some extent user fees must support the creation and dissemination of this information.

The Library of Congress and the national library community want to help develop a national research and education network. The major information resources for this nation reside in the Library of Congress and other research libraries across the country. These collections have been assembled in many cases with federal, state, and local revenues. Our citizens have a right to expect that these irreplaceable intellectual resources be made ever more widely available through a national information network, such as that envisioned in S. 1067.

In conclusion, Mr. Chairman, I want to compliment you on your vision in addressing what I consider an important national priority. The Library of Congress is anxious to assist you in this effort and Mrs. Avram is here with me to answer any of your Committee's questions.

APPENDIX C

LIBRARY OF CONGRESS NETWORK ADVISORY COMMITTEE

CRITERIA FOR MEMBERSHIP

December 1987 (rev. November 1989)

I. **The goals and objectives of the Network Advisory Committee (NAC) are to:**

(1) Advise the Librarian of Congress on the role of the Library in a nationwide network of library and information services;

(2) Promote the development of nationwide networking of library and information services and serve as a focal point and forum regarding networking issues;

(3) Provide input to the Council on Library Resources on its networking related activities; and

(4) Serve as a sounding board and a forum for the U.S. National Commission on Libraries and Information Science (NCLIS) on matters related to networking and of interest to NCLIS.

II. **Eligibility for and Categories of Membership**

U.S. organizations formally constituted and functioning in the public and private (for-profit or not-for profit) sector which are actively engaged in regional or nationwide networking of library and information services, or have a significant impact on the development of nationwide networks providing library and information services, are eligible for membership.

NAC has identified types of organizations generally eligible for membership. These are: national professional membership associations, trade and institutional associations, national libraries/federal information agencies, national bibliographic networks, regional/special bibliographic system operators, network service organizations, national reference systems, and individual library systems. In order to maintain NAC as an effective discussion group and representative of the important organizations in or affecting library and information service organizations, the total membership in NAC is limited to no more than thirty-five, exclusive of the ex officio members.

III. **Requirement for Membership**

Each organization shall appoint one representative and a designated alternate. Members are expected to attend NAC meetings regularly and to participate in committee activities. The representatives shall attend the meetings and be recognized as the voting members; however, if the representative cannot be present at a NAC meeting, the designated alternate may attend the meeting and will be recognized as the voting member. Each organization shall have only one representative at a NAC meeting.

Members are responsible for funding the participation of their representatives. Members are also responsible for reporting on each NAC meeting to their organizations and for informing the NAC membership of activities in their organizations of interest to NAC. Attendance at NAC meetings will be limited to members and at the discretion of the NAC chair, designated observers.

IV. Applications for Membership

Organizations applying for membership are required to submit their request in writing to the NAC chair indicating their interest in and justification for membership. They must show how their organization meets the eligibility requirements for membership and the unique contribution they can make to NAC.

V. Approval of Membership Applications

All applications for membership shall be sent by the NAC chair to the Membership Subcommittee. The Membership Subcommittee shall be appointed by the NAC chair and shall consist of representatives of the public and private sector of NAC, and the chair of NAC, ex officio. After a review of each application, the Membership Subcommittee shall recommend an appropriate action to NAC.

VI. Termination of Membership

To terminate membership, a member must submit the resignation in writing to the NAC chair.
Membership will be forfeited, after the organization is given due notice by the NAC chair, when a member no longer meets the Criteria for Membership; the representative becomes inactive by not attending two consecutive meetings; or the representative is unwilling to participate in NAC activities.

VII. Ex Officio Membership

Representatives of the Council on Library Resources, the U.S. National Commission on Libraries and Information Science, and the Office of Library Programs in the U.S. Department of Education, shall serve as ex officio, voting members of NAC.

VIII. Observers

Observers may be invited to attend NAC meetings by the chair of NAC. The observers may participate in meeting discussions at the discretion of the chair; however, they may not vote.

APPENDIX D

Dear Dan: October 5, 1989

Ken King of EDUCOM and I would like to meet with you, as chairman of the White House Conference on Library and Information Services (WHCLIS) Advisory Committee, to talk about a conference on the potential of a national academic/research and library network for improving end user access to information in the 21st century. The Network Advisory Committee to the Library of Congress (NAC) and EDUCOM have agreed that a conference to (1) inform and educate people about the academic/research and library network roles and (2) clarify policy issues and trends for WHCLIS and other groups would contribute to the WHCLIS process and be a help to the White House Conference delegates.

End users of information, ranging from researchers and scientists to government officials, the private sector, students, and the general public will be highly dependent on electronic access in the 21st century. The conference NAC and EDUCOM envision would explore what academic/research and library networking can do in the next century, how to provide access to all end users, and similar issues.

As you will recall, a conference on Networks for Networkers was held in Indianapolis, Indiana in 1979 prior to the first WHCLIS. I wrote to you in May 1988 to let you know that NAC was exploring holding a second Networks for Networkers conference. The earlier conference and the 1979 WHCLIS (1) crystallized the opinion of the library and information community that the U.S. needed, not a physical national network, but a logical nationwide network of networks to facilitate resource sharing; and (2) prompted new emphasis on the networking program of the Library Services and Construction Act, title III, which was increased from $5 million to $12 million in fiscal 1981.

NAC and EDUCOM propose a conference, Networks for Networkers II, to be held in September 1990. We would like to discuss applying for a base grant and other issues with you.

We have been told by your office that you will be out of Washington for some time. Perhaps a conference call might satisfy the need for a meeting. If you would call my office and speak to Rosa Owens (707-6240) she could set up a call that would be convenient to both of us and Ken King.

Sincerely,

Henriette D. Avram
Assistant Librarian for
Processing Services and
Chair, Network Advisory
Committee

Daniel H. Carter, Chairman
Advisory Committee of the White House Conference
on Library and Information Services
U.S. National Commission on Libraries
and Information Science

APPENDIX D

Dear Dan: January 25, 1990

Enclosed you will find a statement of goals concerning the proposed pre-White House conference "Networks for Networkers II" and the revised fact sheet "Networks for Networkers II." As you can see, the proposed invitational conferences (hosted by the Library of Congress Network Advisory Committee and EDUCOM) aims to further the goals of the second White House Conference on Library and Information Services -- Literacy, Productivity, Democracy.

When I addressed the White House Conference 's Advisory Committee (WHCAC) on December 13, you suggested that we go back and focus our goals more directly toward the overall goals of the second White House Conference. I believe we have done this.

Time is running short, and preparations for a pre-White House Conference have to start as soon as possible if we want to have such a conference. I urge you, as chairman of WHCAC, to consider our proposal and let me know if we should use the suggested "guidelines" to assist us in the preparation of a pre conference activities plan. I understand that the deadline for submittance of the completed "guidelines" to be January 31, 1990.

I look forward to hearing from you.

Sincerely,

Henriette D. Avram
Associate Librarian for
Collection Services
and
Chairman, Network Advisory Committee

Enclosure

Mr. Daniel H. Carter
Chairman, White House Conference
Advisory Committee
and
Commissioner, U.S. National Commission
on Libraries and Information Science
1111 18th Street, NW, Suite 310
Washington, DC 20036

APPENDIX D

COLLECTIONS SERVICES

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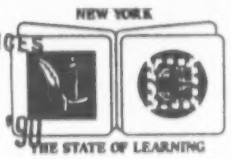

THE STATE EDUCATION DEPARTMENT / THE UNIVERSITY OF THE STATE OF NEW YORK / ALBANY, N.Y. 12230

NEW YORK STATE LIBRARY
DIVISION OF LIBRARY DEVELOPMENT

January 12, 1990

Honorable Daniel H. Carter, Chair
White House Conference on Libraries and Information Services
C/O Daniel Carter Consulting
4005 McDermed Drive
Houston, Texas 77025

Dear Mr. Carter,

In 1988, the Chief Officers of the State Libraries of the Northeast, (COSLINE), organized a working committee comprised of the network coordinators and automation consultants from 11 participating states, from Maine to Maryland. The charge of the COSLINE Networkers Group, is to share the networking and automation planning efforts within each state, and to have the participants benefit from the knowledge gained from these experiences. The goal in these efforts is the expansion and improvement of library networking services to the people of our respective states and the nation.

We understand that the Library of Congress' Network Advisory Group has submitted a proposal to your office to have a preconference on library networks and networking to be held prior to the 1991 White House Conference on Libraries and Information Services. The COSLINE Network Coordinators strongly support this proposal.

The White House Conference will focus on the library's role in literacy, productivity and democracy. Library networks in their many sizes, varieties and capabilities provide essential support to the nation's libraries to enable them to meet American's needs in these three critical areas and others as well. No one library or librarian can fully serve its community without the support of the networks which augment its local resources.

The White House Conference offers an excellent opportunity to consider the

current state and further evolution of library networks in meeting the nation's and the world's information needs. New information technologies have profoundly increased and improved the ability to link people with resources. The pre-conference can provide critical information about how library networks can or must develop and change to fulfill the responsibilities to their users for the 1990's.

We encourage you to endorse and actively support the pre-conference on library networks. If you have comments or concerns, please contact me.

Sincerely,

George E.J. Messmer

cc: Henriette Avram, Chair, Library of Congress' Network Advisory Group
Susan Martin, Executive Director, NCLIS
Barbara Smith, Incoming Chair, COSLINE NETWORKERS
COSLINE

FACT SHEET - NETWORKS FOR NETWORKERS II

A two-day invitational conference

PURPOSE: To inform and educate people about the potential of a logical nationwide network of academic/research and library networking purposes to improve end users' access to needed information and data. To make policy recommendations regarding academic/research and library networking in the 21st century to delegates to the second White House Conference on Library and Information Services (WHCLIS) and to others.

WHCLIS GOALS: The goals of WHCLIS are "to develop recommendations for further improvement of library and information services to increase productivity, expand literacy, and strengthen democracy." The ability of libraries to improve services in each of the three areas is directly related to their ability to be electronically linked to the resources of other libraries nationwide and to tap distant sources of information. Thus a conference on networking issues would contribute to realizing the goals of WHCLIS.

Date: No later than December 1990 to allow time for recommendations to be considered at the WHCLIS to be held July 9-13, 1991 in Washington, D.C.

Sponsors: The Network Advisory Committee to the Library of Congress (NAC) and EDUCOM. NAC is a group of organizations (established in 1976) in the public and private sector that are actively engaged in regional or nationwide networking of library and information services. The goals of NAC are to (1) advise the Librarian of Congress; (2) to promote development of nationwide networking; (3) provide input to the Council on Library Resources; and (4) to serve as a sounding board to the U.S. National Commission on Libraries and Information Science (NCLIS). EDUCOM is the higher education association of six hundred associates concerned with helping colleges and universities make more effective use of information technology. The major focus of EDUCOM's Networking and Telecommunications Task Force is the creation of the National Research and Education Network.

OBJECTIVES: Policy papers would be commissioned on the following objectives:

1. develop conceptual and planning issues;
2. review development issues and recommend new research and development;
3. review and recommend technical standards;
4. determine service and access requirements;
5. explore financing (who pays for what) and include clarification of the roles of the public (federal, state, local), institutional, and private sectors;
6. identify operations and delivery networks (who runs the network).

APPENDIX D Fact Sheet (Cont.)

Participants: Selected (100-180) representatives of the following professional groups -- state libraries, state educational associations, library schools, library associations, federal information agencies, national libraries, academic and school libraries, special-, public-, and very small other libraries, networks, utilities, publisher associations, the private sector, education and research groups, and networkers in a non-library environment.

Funding: The budget is projected to be under $100,000. Sources of funding are being explored. Participants will pay their own expenses, except for hardship cases. Speakers will receive a nominal fee of $1,500 for their camera-ready copy of their presentation and will be reimbursed for their expenses.

Products: Products will include a prompt summary and recommendations (to be used as handouts at WHCLIS), and full published proceedings which may be published both by EDUCOM and NAC.

NETWORKS FOR NETWORKERS II PRECONFERENCE WILL FURTHER GOALS OF WHCLIS II

Goals: The goals of the July 1991 White House Conference on Library and Information Services as announced in December 1989 are "to develop recommendations for further improvement to library and information services to increase productivity, expand literacy, and strengthen democracy." The goal of the proposed preconference, "Networks for Networkers II," is to inform and educate people, and to make policy recommendations, concerning "the potential of a logical nationwide network of academic/research and library networking purposes to improve end users' access to needed information and data."

PRODUCTIVITY: The December 3, 1985, report to the U.S. National Commission on Libraries and Information Science (NCLIS) from the White House Conference Preliminary Design Group, from which the WHCLIS goals were drawn, noted that productivity in the U.S. has slowed over the last decade and our advantage in the world markets has been shaken. Knowledge, learning, information and skilled intelligence are the new raw materials of international commerce. Libraries are information agencies in a global information society. Research and development depend upon access to information. Every day, libraries provide technical reports, international trade information, economic data, federal standards and specifications, copies of patents, and other information needed for business and industrial purposes.

Networking Tie-in: No library--corporate, public, or university--can meet the needs of all its business or research and development users through its own resources. Thousands of libraries--public, school, academic, research, and specialized corporate, agency and association libraries--have used new information and communication technologies to share library and information resources across institutional, local, and state boundaries. Over four million interlibrary loan transactions are logged annually through the OCLC system. Access to information would be severely limited if each library could tap only its own collections.

Challenges: Not all libraries are linked electronically as yet. In addition, the underlying communications structure, both in technical capacity and in standards development, shows signs of strain as libraries, computer centers, and laboratories move from sharing electronic mail, bibliographic citations, and similar modest amounts of data, to sending massive databases, full texts, and graphic and other nontextual material to each other and directly to users. Pending proposals in the Administration and Congress would create an upgraded National Research and Education Network (NREN) to address this issue and increase national competitiveness. According to the President's Office of Science and Technology Policy in a September 1989 report: "The eventual impact of the NREN on national competitiveness may well extend beyond such gains in research productivity. The NREN should be the prototype of a new national information infrastructure which could be available to every home, office, and factory. Wherever information is used, from manufacturing to high-definition home video entertainment,

and most particularly in education, the country will benefit enormously from deployment of this technology."

LITERACY: The Preliminary Design Group called illiteracy a national crisis. Some twenty-seven million persons, or one-fifth of the adult population, are unable to read beyond a fifth grade level. These Americans are functionally illiterate when the changing nature of many jobs and more complex society demand higher levels of reading and writing ability. Libraries play a role in developing and expanding literacy by providing materials and space for educators, literacy tutors and students.

Networking Tie-in: In a society that daily becomes more information-oriented and more economically dependent on the effective use of knowledge, the ability to find and use information is a fundamental skill. Functional literacy now requires being information literate. A healthy system of interconnected libraries is a necessity, both to help develop and to support an information literate society.

Challenges: According to the January 1989 Report of the American Library Association Presidential Committee on Information Literacy: "Out of the super-abundance of available information, people need to be able to obtain specific information to meet a wide range of personal and business needs....To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information." Among the report's recommendations: "We all must reconsider the ways we have organized information institutionally, structured information access, and defined information's role in our lives at home, in the community, and in the work place. To the extent that our concepts about knowledge and information are out of touch with the realities of a new, dynamic information environment, we must reconceptualize them."

DEMOCRACY: More than ever before, according to the Preliminary Design Group, information is a crucial resource in a democratic society. Information is the resource upon which electors make their decisions, and upon which elected and appointed officials and their staffs make decisions that effect those governed. But government decision making is not the sole responsibility of elected or paid officials; a democratic society depends upon the informed participation of its people.

Networking Tie-in: Libraries are a key source of information to meet the needs of government officials and of the citizens governed. Just as for productivity purposes, however, a single library cannot meet the needs of its users within its four walls alone. In library systems, consortia, cooperatives, and statewide, regional, and nationwide networks, the provision of information needed to keep democracy thriving can be much more effective. The hunger for information is palpable in the remarkable flowering of democracy in Eastern Europe today.

Challenges: "As citizens of the world's longest-lasting democracy, we must have easy access to libraries more than ever before. How well we govern, how intelligently we think through one difficult issue after another, how rationally we perform at center stage on the planet, will depend on our taking advantage of that resource." This statement is from the conclusion to Alliance for Excellence, the 1984 report from the U. S. Department of Education in which librarians respond to A Nation at Risk. The report concludes that the American library stands as a framework on which national, state, and local leaders must build a new structure for the Information Age. "Easy access to libraries" in the Information Age requires that libraries be linked electronically to each other and to distant sources of information.

PROCESS: The linking of libraries electronically to share information resources across institutional, local, and state boundaries is a topic that was prominent in the first WHCLIS in 1979. It will surely be addressed during state preconference activities leading to the 1991 White House Conference. However, as was true previously, library and information networking does not fit totally within the state-based preconference structure. It is preeminently an interstate activity, and deserves special attention in the WHCLIS process.

Federal Role: This special status for networking is reflected in the historical and current federal role in support of libraries. Without exception, every major vehicle through which the federal government addresses libraries involves a stimulus to the sharing of resources across boundaries. A nonexhaustive list includes the Library Services and Construction Act, the Higher Education Act title II, the Medical Library Assistance Act, the library postal rate, the three national libraries, the Depository Library Act, and NCLIS itself. The NCLIS enabling statute affirms as national policy that the federal government will cooperate with state and local government and public and private agencies in assuring optimum provision of library and information services.

Networking Preconference: A special conference on library and information networking tied to the WHCLIS process will focus attention on the prominent federal role in support of sharing library and information resources, the remaining needs, whether onrushing technological change requires a rethinking of this federal stimulus role, and what the appropriate roles for all networking players may be in the 1990s and beyond. Such a conference will clearly contribute to the goals of the White House Conference on Library and Information Services.

Fact Sheet and Networks for Networkers II Preconference prepared jointly by: American Library Association, Washington Office; EDUCOM; Library of Congress Network Advisory Committee. January 2, 1990.

United States
National Commission on
Libraries and Information Science

NATIONAL COMMISSION ON LIBRARIES AND INFORMATION SCIENCE

April - November 1989

The National Commission on Libraries and Information Science has been occupied with the expansion of some existing programs and the establishment of others during the past six months. This report summarizes very briefly these activities.

- The second White House Conference on Library and Information Services received $1.75 million in the FY89 Dire Emergency Supplemental Bill, allowing work to start on the conference. By the end of September, all FY89 funds had been distributed to states and territories for their pre-White House Conference activities. The appropriation for FY90 was $3.25 million; the effect of Gramm-Rudman targets was relatively mild, decreasing that amount by only $25,000.

  There is a small temporary staff for WHCLIS; the position of executive director has been listed and the Commission hopes to fill the job in the near future. PLEASE NOTE: the Commission has decided that NCLIS staff will have no responsibility for the Conference. Queries should be addressed to Daniel Carter (chair of the White House Conference Advisory Committee) or Jerald Newman (chair of NCLIS).

- Following a highly successful July hearing on OTA's report "Informing the Nation," NCLIS has embarked upon a series of meetings intended to focus on matters of national and federal information policy. The first such meeting was held on October 11, with 95 attendees from both public and private sectors discussing issues surrounding access to public information. The result of this forum is a small working group whose charge is to develop draft principles of national information policy that can be applied by all organizations that establish de facto information policies. A public forum to discuss the draft will be scheduled some time in late January or early February 1990.

  The transcript from the July hearing will be published and available shortly; the guidelines will be made available in early 1990.

- In January, NCLIS held hearings on the status of information services to the American Indian community. Based upon these hearings, a task force was created, bringing together representatives from NCLIS, the Department of Education, the

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110

Bureau of Indian Affairs, and the Department of Commerce. This group will attempt to identify problem issues and make recommendations regarding the improvement of library and information services to Indians and Native Americans. As part of this effort, NCLIS representatives are also included in a White House interagency task force on Indian affairs.

The transcript from the January hearings will also be made available.

- For the first time, public library statistics will become available through a program sponsored by the National Center for Education Statistics and coordinated by NCLIS. In 1989, 45 states made data available according to data elements agreed upon by an NCLIS task force composed of state library and professional association representatives. The first set of tables generated from these statistics will be published and distributed by the end of November.

- In April, NCLIS and AASL cosponsored a symposium on information literacy, bringing together representatives of two dozen national education organizations. The symposium concluded with a report containing about forty recommendations. These recommendations are now being considered at the national level by each of the participating organizations, with the hope that adoption of the report will make a fundamental change in the way American schools educate children.

- The precepts of the Glenerin Declaration, adopted in 1987 by the United States, Canada, and the United Kingdom, were examined by a group representing the three countries. It was decided to move forward with coordinated development of library statistics, with examination of national and international telecommunications support of information resources, with promulgation of the resource-based learning approaches represented by the information literacy report, and with a coordinated effort to define basic library services for each country's population.

The next meeting of the Commission will be December 10-12 in Washington, just prior to a meeting of the White House Conference Advisory Committee. Further details regarding the meeting, access to the publications mentioned in this report, or NCLIS programs may be obtained by contacting Susan K. Martin, Executive Director, at the above address and telephone number.

November 1989

No. 6 Vondran, Raymond F. *National Union Catalog Experience: Implications for Network Planning.* (Washington: Library of Congress, 1980). 51 p. $4.00.

No. 5 Long, Philip L. *Study of Message Text Formats: Bibliographic Search Queries.* (Washington: Library of Congress, 1979). 28 p. $4.00.

No. 4 Network Technical Architecture Group. *Message Delivery System for the National Library and Information Service Network: General Requirements.* (Washington: Library of Congress, 1978). 35 p. $4.00.

No. 3 Buchinski, Edwin J. *Initial Considerations for a Nationwide Data Base.* (Washington: Library of Congress, 1978). 56 p. $4.00.

No. 2 Dataflow Systems. *A Glossary for Library Networking.* (Washington: Library of Congress, 1978). 34 p. $4.00.

No. 1 Butler, Brett. *A Nationwide Location Data Base and Service.* (Washington: Library of Congress, 1978). 66 p. $4.00.

Single copies are available for sale from the Customer Services Section, Cataloging Distribution Service, Library of Congress, Washington: DC. 20541.

THE LIBRARY
OF CONGRESS